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Exploration of the Sea

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Demersal Fish Committee

REPORT OF THE SAITHE (COALFISH) WORKING GROUP

Copenhagen, 22 - 28 April 1981

Hva med mehe fersk ?

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1. PARTICIPANTS

D W Armstrong	United Kingdom (Scotland)
H Gislason	Denmark
T Jakobsen (Chairman)	Norway
S H Jakupsstovu	Faroe Islands
B W Jones	United Kingdom (England)
J Y LeGall	France
B Mesnil	France
H H Reinsch	Germany, Fed.Rep. of
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V Nikolaev attended the meeting as the ICES Statistician.

2. TERMS OF REFERENCE

At the 68th Statutory Meeting of ICES it was decided (C.Res.1980/2:6):

1. that the Working Group on Fish Stocks at the Faroes should be disbanded and its former functions should be taken over by the Saithe Working Group, which already carries out assessments of saithe stocks in the Faroe region.
2. that the Saithe (Coalfish) Working Group should meet at ICES headquarters from 22-28 April 1981 to:
   - (i) assess TACs for saithe stocks in 1982,
   - (ii) assess TACs for cod and haddock in the Faroe areas,
   - (iii) advise on appropriate mesh sizes for saithe for trawl gears in Sub-areas I and II and Sub-area IV.

3. LANDINGS IN THE NORTH-EAST ATLANTIC

From 1970 to 1976 the total landings of saithe from the marine fishery areas in the North-East Atlantic were in the range of 640 000 - 720 000 tonnes (Table 3.1). In subsequent years landings have gradually declined and preliminary reported landings in 1980 are 366 000 tonnes.

4. NORTH-EAST ARCTIC SAITHE

4.1 Landings and Changes in the Fisheries

Landings in 1980 were 144 000 tonnes (Table 4.1 and Figure 4.1.A) which is 20 000 tonnes less than in 1979 and the lowest landings reported since 1969. The recommended TAC for 1980 was 122 000 tonnes. The reduction in the landings can partly be ascribed to lower landings by Norwegian purse seiners and partly to reduced quotas for other countries inside the Norwegian economic zone.

4.2 Age Composition (Table 4.2)

The age composition for 1979 has been updated. There were no important changes from the data used in the 1980 report. For 1979 and 1980 age

compositions were available from the Federal Republic of Germany and Norway representing 95% and 98% of the landings in the respective years.

4.3 Weight at Age

After the introduction of the Norwegian economic zone, Norway's proportion of the saithe landings from the North-East Arctic has gradually increased and in 1980 made up 86% of the total. Weights at age figures for the Norwegian landings in recent years deviate somewhat from those used in the previous assessments and in view of the increasing proportion of the Norwegian landings, it would seem more appropriate to use Norwegian weight at age data for the catch predictions. A set of weights representing the average for Norwegian landings in 1974-79 was available which gave a sum of products discrepancy of -2.1% for 1980, compared to -3.1% for the old weights at age. In the assessments the new set was used for 1980 and for the predictions, and the old set was used for biomass estimates for years up to 1979. Both sets of weights are given in Table 4.7.

4.4 Fishing Mortality and Stock Values from VPA

4.4.1 Estimates of fishing mortality

In the North-East Arctic 98% of the catches in 1980 were taken by the Federal Republic of Germany and Norway. The German fishery is directed to saithe, and data on effort and catch per unit of effort are available. However, for 1980 and, to a smaller extent for 1979, the complete data were not yet available and could not provide any guidance in the choice of input F values. Furthermore, the severe quota restrictions on the German fishery in recent years are likely to have introduced a bias in the catch per unit of effort data.

For the Norwegian fishery, no effort data relevant to the saithe fishery exist. There have been at least two significant changes in the fishery in 1980. A few trawlers that previously have fished mainly for other species were, for a few weeks, fishing directly for saithe. This may compensate roughly for lower effort from fleets with reduced quotas. Poor fishing in summer and autumn in the southern part of Division IIa made nearly the whole fleet of purse seiners (about 20% of the total fleet) move to northern Norway. The main results of this is likely to have been reduced exploitation of 2 year old fish and increased exploitation of 4 and, to a smaller extent, 5 year old fish. In addition, catches of 2 year old fish by vessels which traditionally fish north of 64°N were somewhat restricted by the minimum landing size of 35 cm.

Using the same set of F values for 1980 as those used as VPA input for 1979 at last year's meeting implied Fs due to fishing by purse seiners in 1980 which, compared to the 1974-78 level, were 40% lower for age 2, approximately unchanged at age 3, 27% higher for age 4 and 13% higher for age 5. There is no information which indicates that the size of the purse seine fleet has been significantly changed after the period 1974-78, and the Fs used for 1980 show a change in the exploitation pattern of purse seiners similar to what was anticipated. However, the input F at age 2 gave an abundance of the 1978 year class which is the lowest on record, about 35% of the long-term average. This would seem contradictory to observations on 0-group made with beach seines in 1978. Lacking any other evidence on this year class strength, F at age 2 was therefore reduced to give the 1978 year class at about 60% of the long-term average. The input F at age 4 for gears other than purse seine was low compared to the

corresponding values for ages 3 and 5, and was therefore increased to produce an exploitation pattern for these gears more in line with previous years. For the older age groups, the Fs were at about the same level as in 1979, and there was no information to indicate that the input F values should be changed.

The input F values from last year's report were therefore used for 1980, except for age groups 2 and 4, and the results of VPA are given in Tables 4.3 and 4.4. Table 4.5 shows the resulting F_{74-78} and F_{80} for purse seine and F_{80} for other gears.

4.4.2 Spawning stock biomass and recruitment

The spawning stock biomass appears to have increased by 20% from 1979 to 1980 (Table 4.6 and Figure 4.1.B).

The average level of recruitment for the year classes 1975-78 has been below the long-term average (Table 4.6 and Figure 4.1.C). In the predictions the long-term average recruitment (343 millions at age 1) has been assumed for the year classes 1979-81.

4.5 Yield per Recruit

The yield per recruit curve based on the data given in Table 4.7 is shown in Figure 4.1.D. The present level of F ($\overline{F}_{5-10}$, unweighted) is at 0.2, $F_{max} = 0.17$ and $F_{0.1} = 0.11$.

4.6 Catch Predictions

In 1981 quotas for countries other than Norway have been reduced but the resulting changes in effort are likely to be small. The Norwegian fishery by gears other than trawl is not likely to increase its fishing effort in 1981, but there may be some increase in the effort of the trawlers. On this basis it seems most reasonable to assume that there will be no change in the exploitation of the older age groups from 1980 to 1981.

From the start of 1981 the minimum landing size of saithe has been increased from 35 cm to 40 cm north of 65°N and from 32 cm to 35 cm between 62°N and 65°N. From 1982 the minimum landing size will be 40 cm for the whole area. It is likely that this regulation in 1981 could effectively stop purse seine fishing for long periods in areas between 62°N and 69°N. This would clearly improve the exploitation pattern and possibly also decrease the effort of purse seiners, but to quantify the effects with reasonable accuracy is extremely difficult. In view of the uncertainty about what the level of the exploitation in 1981 will be, the Group felt that at this stage the only option for exploitation in 1981 should be to assume the same level of exploitation as in 1980. However, since 1980 was atypical as far as the purse seine fishery is concerned, the exploitation pattern used last year, which is equal to the 1980 pattern except for ages 2 and 4, was used for the prediction. The results are shown in Table 4.8 and Figure 4.2. The landings predicted for 1981 are 140 000 tonnes, which is 14% greater than the TAC recommended by the ACFM.

4.7 Long-term Effects of Reduced Purse Seine Fishing

Additional long-term yield calculations were made with the fishing mortalities assumed for 1981 in the catch prediction, but with three options for reduction of Fs by purse seiners:

1) 20% reduction
2) 50% reduction
3) No purse seining.

Fishing mortality due to other gears is assumed to be maintained at the present level. Recruitment at age 1 is the average recruitment for year classes 1960-76 (343 x 10^6). The results are given in Table 4.9. With reduction in purse seining of 50% the fishing mortality will be close to F_{max} and in the case of no purse seining $F = 0.62 \times F_{max}$.

5. NORTH SEA SAITHE

5.1 Landings (Table 5.1, Figure 5.1.A)

In 1980 the reported landings from the North Sea were 117 403 tonnes (provisional) and the TAC was 129 000 tonnes. Total catch reported for 1979 is 114 394 tonnes. By-catches from industrial fisheries were small in both years.

5.2 Age Composition (Table 5.2)

Age composition of the catches was updated for 1979 and provisional data for 1980 were available from Denmark, England, France, Federal Republic of Germany, Norway and Scotland. The landings of these countries represented 96% of the total landings.

The available catch at age data for the human consumption fisheries were summed and then raised to the total landings from this fishery. The age composition of the industrial landings was added to the resultant age composition to give the age composition of the total landings. The catch at age data used as input for the VPA are given in Table 5.2.

5.3 Weight at Age (Table 5.5)

Weight at age data were provided for 1979 and 1980 by Scotland, England, France, Norway and Denmark. Annual averages weighted by numbers caught were calculated and used for weight at age in the total catch and in the stock. Prior to 1979 the weight at age data previously used by the Working Group have been retained for all years.

5.4 Fishing Mortality and Stock Values from VPA

5.4.1 Estimates of fishing mortality

The amount of available data on fishing effort in the North Sea is still very unsatisfactory. However, this year French effort data were supplied to the Working Group. These data were used to calculate the total effort of the international fleet by dividing total landings by the French catch per unit effort. The data (Table 5.6) do not indicate any substantial change in effort from 1979 to 1980. Furthermore, there was no reason to suspect any change in the exploitation pattern, and the Working Group therefore decided as a first trial to use the same F input values as last year. The output from the VPA showed a trend in the average F (age 5-10) which was in reasonable agreement with the available effort data. It was therefore adopted by the Group with no further modification than to adjust the input F value for the 1979 year class to a level which produced a stock size at age 1 equal to the average long-term recruitment (R_I = 236 million fish). The input F values and the resultant calculated stock sizes are shown in Tables 5.3 and 5.4 respectively.

5.4.2 Spawning stock biomass and recruitment

Spawning stock biomass (Table 5.7 and Figure 5.1.B) since 1976 has fluctuated between 200 000 tonnes and 300 000 tonnes. Table 5.7 and Figure 5.1.C show recruitment at age 1. The year classes 1975-78 all appear to be below the long-term average. In the catch predictions, the 1979-1981 year classes are assumed to be equal to the long-term average.

5.5 Yield per Recruit

The yield per recruit curve was calculated using the new weight at age data for 1980 and the current exploitation pattern (Table 5.8). Due to the new set of weight at age data, F_{max} has changed from last year's value of 0.22 to 0.24 (Figure 5.1.D).

5.6 Catch Predictions

Input data for catch predictions are given in Table 5.8. The estimate of the 15+ group in 1980 was higher than the estimate of the 14+ group in 1979 (Table 5.4) and for predictions the 15+ group in 1980 was set at 500 000 fish to make it more consistent with the level in the preceding years. The TAC for 1981 is 127 000 tonnes, and the predicted catch in 1981 with unchanged fishing mortality is 120 000 tonnes.

Results of catch predictions are shown in Table 5.9 and Figure 5.2.

6. ICELANDIC SAITHE

6.1 Landings

Landings of saithe from Division Va are shown in Figure 6.1.A and in Tables 3.1 and 6.1. Catches increased from about 48 000 tonnes in the early 1960s to a peak of 137 000 tonnes in 1971. This increase in landings was connected with increasing year class strengths and an increase in effort. Since 1971 catches have been declining and in 1980 (58 000 tonnes) they were back at a level similar to that in the mid-1960s. Declining catches in the 1970s are due to a series of year classes of well below the long-term average strength.

6.2 Age Composition

As in recent years age composition data were available only for Icelandic catches which accounted for 90% of the total landings in 1980. The total catch in numbers used as input for the VPA (Table 6.2) was calculated by raising the other catches with the Icelandic age composition data. The 1979 data were revised and updated.

6.3 Weight at Age

In 1979 several thousands specimens of saithe were measured for length and weight. From these data the length/weight relationship was revised. Average weight at age in the Icelandic catches in 1979 and 1980 are given in Table 6.6. The 1979 weight at age data were used for the period 1974-79, when sum of products estimates were within 2% of the actual landings. In the period 1961-73, however, the sum of products using the 1979 data are in excess of the landing figures. 1980 weight at age data were used for that year and also for the catch predictions.

6.4 Fishing Mortality and Stock Values from VPA

6.4.1 Estimates of fishing mortality

The extension of the temporary fishing ban on cod in 1980 seems to have diverted the Icelandic trawler fleet more towards redfish than saithe, due to the increasing availability of redfish. On this basis no marked change in the effort on saithe was likely to have taken place in 1980 and, therefore, input F values for 1980 were the same as those used for 1979 at last year's meeting (Table 6.3). The unweighted mean fishing mortality in the age groups 5-10 which account on average for more than 75% of the catches, has been taken as a reference F in the presentation of the assessments.

6.4.2 Spawning stock biomass and recruitment

From 1960 to 1969 the spawning stock biomass increased from 120 000 tonnes to 446 000 tonnes (Table 6.5 and Figure 6.1.B). In the following years, it gradually decreased to 145 000 tonnes in 1980 due to the low recruitment in the 1970s. This level, however, is still in excess of that estimated for the early 1960s.

Recruitment levels for the year classes 1960-67 were higher than those for the year classes 1968-76. The abundances of year classes 1977 and 1978 at age 2 were assumed to be equal to the average value of 39 million fish for the year classes 1968-76.

Input Fs at age 2 and 3 in 1980 were adjusted to produce this result. For the predictions, abundances of year classes 1979 and 1980 were also assumed to be 39 million fish (32 million at age 3).

6.5 Yield per Recruit

The yield and spawning stock biomass per recruit curves are shown in Figure 6.1.D. Using the assumed 1980 exploitation pattern, the yield per recruit curve is flat-topped. F_{max} is about 0.5 and the current fishing mortality on age groups 5-10 is estimated to be $\bar{F}_{5-10} = 0.35$.

6.6 Catch Predictions

The input data for the catch predictions are shown in Table 6.7. The catch predictions are based on the 1980 exploitation pattern used as input into the VPA.

The TAC for 1981 recommended by ACFM is 72 000 tonnes. It is not likely, however, that fishing mortality rates on saithe in 1981 will increase above the 1980 level. This is because no further extension of the ban on cod fishing is currently envisaged for 1981 and therefore, no further fishing effort should be redirected at saithe. On this basis the Group assumed that fishing mortality in 1981 would be equal to that in 1980. This leads to a prediction of the 1981 landings of 60 000 tonnes. The associated spawning stock biomass in 1982 will be 173 000 tonnes. The results for catch in 1982 and total stock and spawning stock biomasses in 1983 are shown in Table 6.8 and Figure 6.2.

7. FAROE SAITHE

7.1 Landings and Changes in the Fisheries

Preliminary catch data indicate a total catch of 25 568 tonnes from the Faroe saithe stock in 1980 (Table 7.1 and Figure 7.1.A.). This is

a reduction by 1 678 tonnes compared to 1979. Foreign catches have declined further and constituted only 6% of the total catch in 1980. The Faroese catches increased by 2 220 tonnes in 1980.

7.2 Age Composition (Table 7.2)

Provisional age compositions for 1980 for the Scottish, the Federal Republic of Germany and the Faroese landings were available. The Norwegian catch at age was estimated from Faroese gill net catch at age compositions. The French and United Kingdom (England and Wales) catches were distributed according to age distributions of catches by Faroese trawlers (larger than 1 000 HP). A revision of the Faroese catch at age data base back to 1977 was made.

7.3 Weight at Age

The weight at age data set used by the 1980 Working Group lead to great discrepancies between the sums of products and landings when applied to the catch at age data in previous years. B W Jones (C.M.1980/G:33) showed that in the period 1960-78 great long-term fluctuations in the length and weight at age have taken place in the saithe stocks. The Working Group therefore decided to use English weight at age data for the years 1962-78 (Table 7.5). This resulted in a better fit between the sums of products and the landings (Table 7.6). For the 1979 catch at age, the weight at age data used by the Working Group in 1980 were used, and for 1980 weight at age data from the Faroese landings were used. The length/weight relationship used with the English length at age data is $W = 8.5 \times 10^{-6} \times l^{3}$, and the length/weight relationship on the Faroese length at age data is $W = 5.4 \times 10^{-6} \times l^{3.12}$.

7.4 Fishing Mortality and Stock Values from VPA

7.4.1 Estimates of fishing mortality

The fishing pattern for saithe by the Faroese fleet in 1980 was similar to that in 1979, with a fishery from October-April on adult fish aggregating on the spawning grounds, and another fishery during summer in shallower water exploiting mainly younger fish. In 1980 there was a reduction in effort by smaller trawlers (less than 1 000 HP) which might have reduced the effort on the younger age groups to some extent. A new fleet category (pair trawlers), however, entered the fishery in 1980 exploiting only young fish, and for the first time 2 year old saithe were caught in significant numbers. The effort exerted by larger Faroese trawlers (larger than 1 000 HP) was somewhat reduced in 1980 compared to 1979, and the effort by non-Faroese fishing vessels was also reduced in 1980 compared to 1979.

The available evidence therefore indicates the following:

1) F on young fish in 1980 is greater than F on old fish in 1980;

2) F on young fish in 1980 is greater than F on young fish in 1979;

3) F on old fish in 1980 is equal to or less than F on old fish in 1979.

Previous assessments and trial VPAs made at this meeting indicate F levels of the order of 0.3 to 0.4.

The set of input F values for 1980 chosen by the Group was 0.35 for ages 4-6 and 0.30 for older ages. These values allow the three conditions mentioned above to be more or less satisfied.

F on age 2 in 1980 was adjusted to produce recruitment at age 1 in 1979 of either 40 x 10^6 or 20 x 10^6 (see Section 7.6 for further comment). F at age 3 in 1980 was then set to a value intermediate to the values of F at age 2 and F at age 4.

The VPA results are given in Tables 7.3 and 7.4.

7.4.2 Spawning stock biomass and recruitment

The change in weight at age used for the biomass calculations compared to previous meetings of the Working Group alters the whole set of spawning stock biomass estimates. The overall trend, however, is the same as in earlier calculations (Table 7.7, Figure 7.1.B). The revision of the Faroese catch at age data led to minor alterations in the recruitment estimates (Table 7.7, Figure 7.1.C) compared to the 1980 estimates.

No independent estimate is available for the strengths of recruiting year classes. From the VPA the recruitment appears to have varied extensively with good recruitment in the years 1960-65, very good recruitment in the period 1966-69, and thereafter there was a declining trend in the recruitment, resulting in very poor year classes in 1974 to 1976. Subjective observations on the local handline fishery for 1-3 year old saithe in the Faroese fjords indicate the 1978 year class to be above the average abundance estimated for recent years.

7.5 Yield per Recruit

Curves of yield per 3 year old recruit and spawning stock biomass per recruit are plotted in Figure 7.1.D. Fishing mortality in 1980 ($\bar{F}_{5-10}$ = 0.32) is less than F_{max} = 0.40. For a constant average recruitment (1961-77) of 22.61 million three year olds, the equilibrium yield with the 1980 exploitation pattern would be approximately 39 000 tonnes, and the corresponding spawning stock biomass of approximately 116 000 tonnes. For an average recruitment as in the recent years (1976-80) of 10.4 million three year olds, the equilibrium yield with the 1980 exploitation pattern would be approximately 18 000 tonnes and the corresponding spawning stock biomass of approximately 54 000 tonnes.

7.6 Catch Predictions

Input data for the catch predictions are given in Table 7.8. Two assumptions were made about the recruitment of the 1978 year class in 1981: high recruitment (R_3 = 27.5 x 10^6) and low recruitment (R_3 = 13.2 x 10^6), corresponding to 40 x 10^6 and 20 x 10^6 as 1 year olds. The 1979 year class is assumed to be low (20 x 10^6 as 1 year olds) consistent with the low recruitment in recent years.

In Table 7.9 the yield in 1982 and the spawning stock biomass estimates for 1983 are given under different assumptions of fishing mortality in 1981, two different options on the 1978 year class strength and a range of fishing mortalities in 1982. In Figure 7.2 yield in 1982 and spawning stock biomass estimates in 1983 are given, assuming a good 1978 year class and the same fishing mortality in 1981 as is assumed for 1980.

8. WEST OF SCOTLAND SAITHE

8.1 Landings

Landings of saithe from Sub-area VI are shown in Figure 8.1.A and in Table 8.1. The TAC for 1980 was 31 000 tonnes, while landings were 22 000 tonnes.

8.2 Age Composition

Revised data for 1979 and preliminary data for 1980 were available from United Kingdom (England and Wales), United Kingdom (Scotland) and France. These data accounted for 97% of the 1979 landings and 98% of the 1980 landings (Table 8.2).

At last year's meeting it was noted that the SOP discrepancy for the French data for 1979 was very large, and the numbers landed at age by French vessels were adjusted accordingly. Revised French data for 1979 now available to the Group do not exhibit a large SOP discrepancy, and the inclusion of these revised data in the final data for 1979 is the main reason why the preliminary data for 1979 used at last year's meeting and the final 1979 data differ considerably.

8.3 Weight at Age

Mean weight at age values used in making predictions are shown in Table 8.7. These values are the weighted means for the years 1979 and 1980 and are higher than the values previously used by the Group.

Sum of products discrepancies for each national data set in both 1979 and 1980 were all less than 7%. Scottish and French numbers at age were adjusted to compensate for these discrepancies. For the English data, mean weight at age was adjusted.

8.4 Fishing Mortality and Stock Values from VPA

8.4.1 Estimates of fishing mortality

Table 8.5 shows the estimation of fishing effort relative to 1980. From these data it appeared that fishing effort in the period 1974-77 was about 1.4 x fishing effort in 1980. Average fishing mortality rates at age for the period 1974-77 were divided by 1.4, the result smoothed very slightly and the resulting values were used as inputs for 1980. Arithmetic mean values of F for age groups 5 to 10 were then calculated for the period 1971-80 and were plotted as relative values against the corresponding relative fishing effort data (Figure 8.2). The values input for 1980 are reasonably consistent with the historical data set.

8.4.2 Spawning stock biomass and recruitment

Historical spawning stock biomass figures are shown in Table 8.6 and Figure 8.1.B.

The estimated spawning stock biomass for 1979 and 1980 is slightly higher than that estimated for 1978. This is due, at least in part, to the higher values of mean weight at age estimated for 1979 and 1980 (see Section 8.3).

The estimated number of recruits at age 1 for the period 1961-78 are shown in Table 8.6 and Figure 8.1.C.

No data are available for Sub-area VI to assess the abundance of recent year classes, and for this reason an average value for year classes 1960-77 (48 millions) was used for the abundance of the 1978 and 1979 year classes (F at age 1 and 2 in 1980 was adjusted to produce this result). The same value was used for 1981 and 1982 in the prediction runs.

8.5 Long-Term Yield and Spawning Stock Biomass

The long-term yield and spawning stock biomass curves are shown in Figure 8.1.D and Figure 8.1.E, respectively.

The long-term yield curve is flat-topped. F_{max} is more than double the current level of fishing mortality which approximates to $F_{0.1}$.

8.6 Catch Predictions

The input data for catch predictions are shown in Table 8.7.

Two options were run:

1) assuming $\bar{F}_{5-10}$ in 1981 = $\bar{F}_{5-10}$ in 1980

2) assuming the 1981 TAC of 27 000 tonnes was taken exactly.

For Option 1 the assumed $\bar{F}_{5-10}$ in 1981 is 0.108, while for Option 2 the required F in 1981 is 0.116. The two options are thus virtually identical and only results for Option 1 are presented (Table 8.8, Figures 8.1.D and 8.1.E).

8.7 Problems with the Data Base

The Group has become increasingly aware of problems with the data base for saithe in Sub-area VI.

Various short-term measures have been taken at previous meetings to compensate especially for such factors as large sum of products discrepancies. This year, it appears that the historical data set of mean weight at age might not be the most appropriate.

It is intended that an extensive revision of the Scottish data shall be carried out before the next meeting. This will probably result in changes being made to the worked up data for the international fishery. It therefore seems appropriate to completely rework the historical landings and mean weight at age sets before the next meeting.

9. FAROE COD

9.1 Faroe Plateau Cod

9.1.1 Landings and fishing effort

Landings in 1979 and 1980 were 23 000 tonnes and 20 000 tonnes respectively (Tables 9.1 and 9.2, Figure 9.1.A) and in both years landings failed to reach the recommended TACs of 26 000 tonnes and 22 000 tonnes. In 1980 97% of the total landings were made by Faroese vessels. Records of fishing effort show that compared with 1979, effort was less for some of the Faroese vessel categories while other categories remained about constant. A small overall reduction in fishing effort is likely to have been the net result.

9.1.2 Age composition (Table 9.3)

Age compositions of Faroese landings for the period 1973-79 have been revised from those used in previous assessments. The revision was undertaken because it was considered more reliable to process and raise the age compositions for each vessel category separately rather than to sum the sampled age compositions and raise to the total Faroese landings. New age composition data were prepared for landings in 1980. Again in 1980 larger than normal landings were

reported to have been taken in the Faroe area by vessels of the Federal Republic of Germany. It was again assumed by the Group that these fish were incorrectly attributed to Division Vb and they were accordingly excluded from the data used in the assessments.

9.1.3 Weight at age (Table 9.6)

For the period 1961-76 the weight at age data previously used by the Working Group were again utilized for the calculation of stock biomasses. For 1977-80 annual weight at age data determined from Faroese landings have been used. These data were derived from mean lengths at age converted to weight using the relationship $w\ (kg) = l^3\ (cm) \times 10^{-5}$. Sums of products gave weights of landings within 5% of nominal landed weights for the years 1977-80. For the earlier years discrepancies up to 20% were observed but these will not significantly affect the interpretation of the temporal trend in spawning stock biomass.

9.1.4 Fishing mortality in 1980

Catch age compositions per unit fishing effort are available for United Kingdom trawlers for a long historical period, but the recent data have become inadequate because of the very limited amounts of United Kingdom fishing in the Faroe area in the last two years. An analysis to obtain estimates of F in 1980 was attempted using catch per unit effort methods developed by the North Sea Roundfish Working Group and the Faroese longline data for 1973-80 both in an aggregated form and also disaggregated by age. The results of this analysis were inconclusive. Consequently estimates of F at age in 1980 were chosen by the Working Group to simulate a small reduction in fishing effort in 1980 compared to 1979 (see Section 9.1.1).

9.1.5 Results of VPA (Tables 9.4 and 9.5)

9.1.5.1 Fishing mortality

Estimates of fishing mortality in each year, calculated from VPA, are given in Table 9.4 together with input values for 1980 and for the oldest age group in each year.

9.1.5.2 Spawning stock biomass and recruitment

Estimates of spawning stock biomass (age groups 4 to 10+) are given in Table 9.7 and shown graphically in Figure 9.1.B. Spawning stock biomass reached the maximum recorded level in 1977 when the very abundant 1972 and 1973 year classes had both been recruited to the adult stock. Since then, spawning stock biomass has become reduced to a more average level by 1980.

The estimated number of recruits at age 1 for the year classes 1960 to 1978 are given in Table 9.7 and Figure 9.1.C. Estimates of year class strength from 0-group surveys are not sufficiently reliable to predict the abundance of recruiting year classes and therefore year classes 1979-81 have been assumed to be equal to the average calculated for year classes 1970-76 (22.64 million). F at age 1 in 1980 in the VPA was adjusted to give this figure. The estimate for the 1978 year class must be regarded as provisional, but it appears from VPA to be an abundant one, and this is supported by the catch per unit effort data from the longline fishery.

9.1.6 Yield per recruit

Curves of yield per 1 year old recruit and spawning stock biomass per recruit are plotted in Figure 9.1.D using the data given in Table 9.8. Fishing mortality in 1980 ($\bar{F}_{4-7}$ = 0.36) is slightly in excess of F_{max} = 0.32. For a constant average recruitment of 22.64 million 1 year olds the equilibrium yield with the 1980 exploitation pattern would be approximately 25 000 tonnes, and the corresponding spawning stock biomass would be 88 000 tonnes.

9.1.7 Catch predictions

Data used in catch predictions are given in Table 9.8 and the results are given in Table 9.9 and plotted graphically in Figure 9.2. If fishing mortality in 1981 is maintained at the 1980 level ($\bar{F}_{4-7}$ = 0.36) landings of 23 000 tonnes are predicted which are greatly in excess of the currently recommended TAC for 1981 of 14 000 tonnes. This is due mainly to the current estimate of the 1978 year class being much larger than was assumed in last year's assessment. If fishing in 1981 was limited to that required to take the TAC a reduction in fishing mortality to $\bar{F}_{4-7}$ = 0.21 would be required. A third assumption made was F in 1981 to be 75% of the 1980 level when landings in 1981 of 17 900 tonnes would be expected. For each of these alternatives for 1981 a full range of predictions for 1982 are given.

9.2 Faroe Bank Cod

Landings of cod reported from Faroe Bank were 2 000 tonnes in 1979 and 1 200 tonnes in 1980 (Table 9.2). The TAC recommended for 1980 was 3 300 tonnes. Data were not adequate for an analytical assessment and the TAC for 1982 will again have to be recommended on the basis of historical catches.

10. FAROE HADDOCK

The assessment was made for the stock of haddock for the total Faroe (Division Vb) area.

10.1 Landings and Fishing Effort

Landings declined to a very low level in 1979 and 1980 with 12 400 tonnes and 14 500 tonnes being reported (Tables 10.1 and 10.2, and Figure 10.1.A). These were well below the recommended TAC which was 20 000 tonnes in each year. Fishing effort data were available for the Faroese fleets and the changes in effort have been commented on in Section 9.1.1.

10.2 Age Composition (Table 10.3)

Age compositions for Faroese landings from Faroe Plateau were revised for the period 1973-79 as described for cod in Section 9.1.2. New data were available for 1980. Total age compositions for Faroe Plateau were raised to total Faroe landings in those years where no separate data were available for Faroe Bank.

10.3 Weight at Age (Table 10.6)

Weight at age data previously used by the Working Group were retained for the period 1961-76 for calculation of stock biomasses. From 1977 to 1980 new annual weight at age arrays were used. These were calculated from mean length at age data from Faroese landings converted

to weight using the relationship w (kg) = l^3 (cm) x 9.5 x 10^{-6}. For this latter period sums of products were within 4% of recorded landings. Larger discrepancies were observed in some earlier years but these were not sufficient to affect the interpretation of spawning stock biomass trends.

10.4 Fishing Mortality in 1980

Age compositions per unit fishing effort were available for the last two years for the Faroese fleets only. Analyses similar to those made for Faroe Plateau cod were attempted to obtain estimates of fishing mortality in 1980. Again the results were inconclusive and input F values for VPA had to be chosen on the basis of the fishing effort trends mentioned in Section 9.1.1. This procedure was not very successful, however, since all attempts produced values of fishing mortality in 1979 which were lower than those in 1980. It is clear, however, that fishing mortality on age groups 2 and 3 have been significantly reduced since the trawl minimum mesh size was increased in 1978.

10.5 Results of VPA (Tables 10.4 and 10.5)

10.5.1 Fishing mortality

Estimates of fishing mortality in each year, calculated by VPA, are given in Table 10.4, together with input values for 1980 and for the oldest age group in each year.

10.5.2 Spawning stock biomass and recruitment

Estimates of spawning stock biomass (Table 10.7 and Figure 10.1.B) were relatively stable at about 60 000 tonnes up to 1974. Subsequently the spawning stock benefitted from the recruitment of the abundant 1972 and 1973 year classes which increased the spawning stock to about 100 000 tonnes. By 1980 the spawning stock had returned to an average level.

The estimated numbers of recruits at age 1 for year classes 1960 to 1978 are given in Table 10.7 and Figure 10.1.C. In recent years the year classes of 1972 and 1973 were the highest on record but subsequently recruitment declined and the 1977 year class was the smallest recorded, indeed the current abundance estimate indicates that this year class failed almost completely. For the predictions, the year classes 1978-82 have been assumed to be of average abundance (41 million, average for year classes 1960-76).

10.6 Yield per Recruit

Curves of yield and spawning stock biomass per 1 year old recruit are plotted in Figure 10.1.D, using the data in Table 10.8. Recent increases in the trawl minimum mesh size have improved the exploitation pattern on haddock, and the yield per recruit curve is now essentially flat-topped. The 1980 level of fishing mortality, $\bar{F}_{4-7}$ = 0.29, is below F_{max} which is approximately 0.65. For a constant average recruitment of 41 million 1 year olds the equilibrium yield at the 1980 level of fishing mortality would be 18 400 tonnes and the corresponding spawning stock biomass would be 96 000 tonnes.

10.7 Catch Predictions

Data used in the catch predictions are given in Table 10.8. The results are shown in Table 10.9 and plotted graphically in Figure 10.2. If fishing mortality in 1981 is maintained at the 1980 level ($\bar{F}_{4-7} = 0.29$) landings of 12 300 tonnes are predicted which is below the recommended TAC of 15 000 tonnes. To take the TAC would require an increase in fishing mortality in 1981 to $\bar{F}_{4-7} = 0.37$. For each of these options for 1981 a full range of catch predictions is given for 1982.

11. OTHER STOCKS IN DIVISION Vb

Landing statistics for other stocks in Division Vb have been updat to include 1979 and are given in Tables 11.1 to 11.10.

12. APPROPRIATE MINIMUM MESH SIZE FOR SAITHE IN SUB-AREAS I, II and IV

In the saithe fisheries in Sub-areas I, II and IV, a number of different gears are used of which especially purse seine, gill net and trawls are important. The optimum mesh size for trawls is dependent on the level of fishing mortality and to advise on the appropriate mesh size it is necessary to know how much each gear will contribute to the fishing mortality in the future. With the uncertain situation in Norway concerning the new minimum landing size and also increasing Norwegian effort with gill nets in the North Sea, nothing definite can be said about what the optimum mesh size for trawls should be in the future.

REFERENCE

Jones, B W. 1980. Growth changes in the North-East Atlantic saithe stocks and the implications for stock assessment". ICES, Doc. C.M.1980/G:33 (mimeo.).

Table 3.1 Summary of total landings of SAITHE from the main fishing areas (in tonnes, whole weight). This table is based on the biological data supplied to the Working Group and used in the assessments. These figures differ to some extent from the official Bulletin Statistique data, which are used for Tables 4.1, 5.1, 6.1, 7.1 and 8.1.

(IV + IIIa includes industrial fishery by-catch by Denmark and Norway)

Year	Fishing area					Total
	I + II	IV+IIIa	Va	Vb	VI	
1960	136 006	31 515	48 120	11 845	8 349	235 835
1961	109 821	35 489	50 826	9 592	6 724	212 452
1962	122 841	24 559	50 514	10 454	7 159	215 527
1963	148 036	30 300	48 011	12 693	6 609	245 649
1964	198 110	58 669	60 257	21 893	13 596	352 525
1965	184 548	73 274	60 177	22 181	18 395	358 575
1966	201 860	96 353	52 003	25 563	18 534	394 313
1967	191 191	76 759	75 712	21 319	16 034	381 015
1968	107 181	98 179	77 549	20 387	12 787	316 083
1969	140 379	115 550	115 853	27 437	17 214	416 433
1970	260 404	222 100	116 601	29 110	14 538	642 753
1971	244 732	252 619	136 764	32 706	19 246	686 067
1972	210 508	245 801	111 301	42 186	29 225	639 021
1973	215 659	225 771	110 888	57 574	35 812	645 704
1974	262 301	272 944	97 568	47 188	36 298	716 299
1975	233 453	278 126	87 954	41 578	30 949	672 060
1976	242 486	319 758	82 003	33 067	41 432	718 746
1977	182 808	194 858	62 026	34 829	28 467	502 988
1978	154 465	142 077	49 672	28 136	31 536	405 886
1979	164 180	114 394	62 504	27 246	21 708	390 032
1980⌘)	143 608	117 403	57 776	25 568	22 030	366 385

⌘) Preliminary

Table 4.1. Nominal catch (tonnes) of SAITHE in Sub-area I and Divisions IIa, IIb, 1971-80. (Data for 1971-79 from Bulletin Statistique.)

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980[*]
Belgium	-	-	-	5	47	1	-	-	-	-
Faroe Islands	215	109	7	46	28	20	270	809	1 117	533
France	14 536	14 519	11 320	7 119	3 156	5 609	5 658	4 345	2 601	945
German Dem. Rep.	16 840	7 474	12 015	29 466	28 517	10 266	7 164	6 484	2 435	-
Germany, Fed.Rep.of	12 204	24 595	30 338	33 155	41 260	49 056	19 985	18 190	14 823	12 511
Netherlands	-	-	-	-	-	64	-	-	-	-
Norway	128 499	143 775	148 789	152 699	122 598	131 675	139 705	121 069	141 346	128 445
Poland	6 017	1 111	23	2 521	3 860	3 164	1	35	-	-
Portugal	-	-	-	-	6 430	7 233	783	203	-	25
Spain	13 097	9 247	2 115	7 075	11 397	21 661	1 327	121	685	263
Sweden	-	-	-	-	8	-	-	-	-	-
U.K. (England & Wales)	10 361	8 223	6 503	3 001	2 623	4 651	6 853	2 790	1 170	794
U.K. (Scotland)	106	125	248	103	140	73	82	37	-	-
USSR	39 397	1 278	2 411	28 931	13 389	9 013	989	381	3	92
Total	241 272	210 456	213 769	264 121	233 453	242 486	182 817	154 464	164 180	143 608

[*] Preliminary

Table 4.2 North East Arctic SAITHE.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	18596	1	1	281	110	1	497	1	194
2	30430	7450	6952	5297	4090	25952	19842	11608	13829
3	37115	22392	29664	25196	77333	43540	77019	65178	76296
4	5001	54537	24836	18384	11949	62846	59280	52389	25206
5	26300	13124	55956	5101	16939	13987	26961	29146	26911
6	10142	12899	4125	8282	4747	16189	9556	10186	16031
7	2861	4652	5616	787	4798	5122	9592	5616	7114
8	2110	1374	2916	1913	1126	7950	2901	3547	3935
9	2733	933	1413	900	1711	2504	4352	1865	2871
10	699	965	1397	577	675	3697	2195	2140	2610
11	990	472	849	391	202	1096	3136	1229	1565
12	568	560	629	239	140	757	1503	796	791
13	444	597	550	141	31	323	554	331	812
14	699	443	408	131	48	276	232	261	442
15+	892	828	1057	264	90	347	465	532	314
TOTAL	139580	121227	116369	67884	125989	184587	217685	184825	178921

	1974	1975	1976	1977	1978	1979	1980
1	1	1	52	121	1711	907	22
2	21159	81601	54151	31662	45758	28334	14650
3	36782	60832	125030	99049	48969	61963	48452
4	44027	11691	30576	34317	27685	23328	31065
5	15671	16366	7947	10140	12476	14122	7066
6	20419	4436	8712	2062	4534	4400	7595
7	12148	7808	3435	4332	1468	2901	3071
8	4802	6789	3212	1456	1848	963	2043
9	3258	2914	2679	1606	938	1356	755
10	2505	2350	1724	963	976	458	878
11	1436	1937	1091	463	655	305	429
12	1444	1245	852	244	681	281	453
13	432	459	489	211	284	168	253
14	263	260	140	58	231	222	252
15+	246	239	308	158	299	216	246
TOTAL	164593	198928	240398	186842	148513	139904	116630

Table 4.3 North-East Arctic SAITHE.
Fishing Mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.18	0.03	0.04	0.02	0.01	0.08	0.10	0.04	0.14
3	0.16	0.20	0.17	0.19	0.32	0.18	0.33	0.54	0.45
4	0.08	0.37	0.35	0.16	0.13	0.48	0.40	0.40	0.41
5	0.34	0.33	0.45	0.11	0.21	0.23	0.38	0.35	0.37
6	0.29	0.28	0.16	0.18	0.14	0.32	0.24	0.24	0.33
7	0.20	0.21	0.19	0.04	0.15	0.22	0.32	0.21	0.27
8	0.23	0.14	0.19	0.09	0.08	0.38	0.19	0.19	0.23
9	0.38	0.15	0.21	0.08	0.11	0.24	0.37	0.18	0.22
10	0.24	0.23	0.36	0.15	0.08	0.35	0.35	0.31	0.41
11	0.27	0.26	0.32	0.16	0.06	0.19	0.37	0.34	0.40
12	0.17	0.24	0.65	0.14	0.08	0.35	0.37	0.28	0.38
13	0.19	0.27	0.39	0.29	0.02	0.26	0.25	0.15	0.50
14	0.30	0.30	0.30	0.15	0.15	0.30	0.30	0.30	0.30
15+	0.30	0.30	0.30	0.15	0.15	0.30	0.30	0.30	0.30
F(5-10),U	0.28	0.22	0.26	0.10	0.13	0.29	0.31	0.25	0.31

	1974	1975	1976	1977	1978	1979	1980
1	0.00	0.00	0.00	0.00	0.01	0.00	0.001
2	0.10	0.25	0.17	0.20	0.19	0.18	0.10
3	0.66	0.47	0.76	0.54	0.53	0.43	0.54
4	0.51	0.46	0.46	0.48	0.28	0.52	0.40
5	0.48	0.36	0.65	0.27	0.32	0.22	0.29
6	0.53	0.24	0.33	0.35	0.19	0.18	0.18
7	0.45	0.39	0.30	0.27	0.45	0.18	0.18
8	0.29	0.49	0.28	0.20	0.18	0.61	0.18
9	0.50	0.29	0.36	0.22	0.19	0.19	0.18
10	0.31	0.37	0.28	0.21	0.20	0.13	0.18
11	0.42	0.42	0.29	0.11	0.22	0.09	0.18
12	0.79	0.79	0.33	0.10	0.24	0.14	0.18
13	0.37	0.63	0.85	0.13	0.16	0.09	0.18
14	0.30	0.40	0.40	0.22	0.20	0.18	0.18
15+	0.30	0.40	0.40	0.22	0.20	0.18	0.18
F(5-10),U	0.39	0.36	0.37	0.25	0.25	0.25	0.20

Table 4.4 North-East tic SAITHE.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	334416	243463	465169	436632	479899	283001	361446	141991	293301
2	202544	257015	199529	380847	357230	392809	231700	295478	116251
3	275967	138259	203700	156921	307027	288781	298190	171806	231439
4	68706	192504	93036	140056	105789	181886	197220	174945	82303
5	100496	51740	108645	53865	98104	75842	92587	108274	96219
6	44402	58655	30570	56711	39501	65073	49507	51605	62470
7	16996	27235	36424	21312	38971	28063	38730	31934	33085
8	11214	11340	18110	24764	16738	27583	18366	23090	21090
9	9415	7282	8046	12202	18549	12688	15447	12425	15710
10	3552	5255	5122	5316	9178	13644	8135	8739	8493
11	4625	2279	3434	2939	3832	6906	7851	4689	5232
12	4004	2896	1442	2049	2054	2955	4667	3621	2735
13	2780	2767	1867	618	1462	1555	1739	2651	2249
14	2961	1876	1728	1035	379	1169	983	1106	1872
15+	3778	3507	4477	2086	711	1470	1970	2253	1330
TOTAL	1085657	1006075	1181099	1297352	1479426	1383425	1328558	1034606	973781
SPAWN. ST.	103727	123093	111220	129031	131377	161106	147394	142113	154268

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1977
1	492943	462176	237581	351049	229390	208116	24285	******	352544
2	239959	403587	378597	194468	287305	186263	169572	19863	280724
3	82715	177380	257021	261028	130709	194023	126982	125622	219249
4	121074	34856	90701	98878	125027	63164	103277	60585	121689
5	44768	59687	18056	46849	50198	77470	30821	56680	73472
6	54614	22609	34171	7681	29238	29888	50718	18882	44428
7	36744	26429	14520	20150	4437	19855	20508	34684	28507
8	20690	19191	14630	8800	12601	2316	13643	14024	18124
9	13726	12623	9629	9090	5894	8653	1035	9330	12064
10	10279	8310	7715	5478	5997	3981	5863	708	7632
11	4612	6164	4694	4766	3618	4031	2865	4010	4771
12	2879	2487	3309	2862	3485	2373	3025	1959	2920
13	1529	1070	926	1944	2123	2240	1689	2069	1781
14	1114	864	465	323	1401	1482	1683	1155	1221
15+	1042	795	1024	880	1814	1442	1643	2274	1948
TOTAL	1128688	1238228	1072840	1014246	893238	805299	557608		
SPAWN. ST.	147230	100542	91084	61974	70608	76262	102671		

Table 4.5. North East Arctic SAITHE
F values for purse seine and for other gears

Age	$\bar{F}_{1974-78}$ Purse Seine	F_{1980} Purse Seine	F_{1980} Other Gears
2	.168	.054	.046
3	.429	.415	.125
4	.145	.254	.146
5	.079	.089	.201
6	.043	.036	.144
7	.025	.038	.142
8	.002	.015	.165
9	.000	-	.180

2 years

Table 4.6 North East Arctic SAITHE
Spawning stock biomass ('000 tonnes) at the beginning of each year and recruitment (estimates from VPA of population size (millions) at 1 year old of each year class).

Year/year class	Spawning stock biomass (age groups 6-15+)	Recruitment
1961	342	144
1962	390	439
1963	385	247
1964	387	334
1965	411	243
1966	440	465
1967	432	437
1968	456	480
1969	486	283
1970	592	361
1971	558	142
1972	532	293
1973	559	493
1974	533	462
1975	403	238
1976	350	351
1977	270	229
1978	290	208
1979	294	-
1980	356	-

Table 4.7 North East Arctic SAITHE
Data used for catch prediction

Age Group	Stock Size 1981 (Thousands)	Relative Fishing Mortality	Average Weight (kg)	Average weight (kg) used in previous prediction
1	343 000	.005	.28	.25
2	280 583	.900	.40	.34
3	125 622	2.700	.67	.71
4	60 585	1.450	1.15	1.11
5	56 680	1.450	1.88	1.63
6	18 882	.900	2.51	2.33
7	34 684	.900	3.25	3.16
8	14 024	.900	4.01	4.03
9	9 330	.900	4.54	4.87
10	708	.900	5.06	5.63
11	4 010	.900	5.58	6.44
12	1 959	.900	6.17	7.11
13	2 069	.900	6.79	7.82
14	1 155	.900	7.48	8.92
15+	2 274	.900	8.50	9.50

For year classes 1979-82, average recruitment has been used $\bar{R}$, (year classes 1960-1976)= 343 X 10^6

Table 4.8 North East Arctic SAITHE
Catch and Biomass Predictions (1 000 tonnes)

Year	Spawning Stock Biomass 1 January	$\bar{F}_{(5-10)}$	Landings
1980	356	0.20	140
1981	339	0.20	140
1982	352	0.20	152

$\bar{F}_{82}/\bar{F}_{80}$	$\bar{F}_{5-10}$ in 1982	Landings 1982	Spawning Stock Biomass 1 January 1983
.1	.02	17	412
.2	.04	34	404
.4	.08	66	388
.6	.12	96	373
.8	.16	125	358
.9	.18	138	351
1.0	.20	152	344
1.2	.24	177	331
1.4	.28	201	318
1.5	.30	212	312

Table 4.9 North East Arctic SAITHE
Long-term Effects of Reduced Purse Seining

Reduction in Purse Seining	Long-term yield (1 000 tonnes)	Long-term Spawning Stock Biomass (1 000 tonnes)
0%	178	425
20%	184	504
50%	195	650
100%	219	1 008

Table 5.1. Nominal catch (tons) of SAITHE in Sub-area IV and Division IIIa, 1971-80
(Data for 1971-1979 from Bulletin Statistique.)

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980*)
Belgium	44	59	55	33	81	127	107	44	14	-
Denmark	11 500	17 000	10 100	8 388	10 149	15 111	17 334	10 372	10 461	9 887
Faroe Islands	18	182	552	581	287	425	318	213	407	425
France	38 330	26 696	32 961	28 619	24 396	32 552	41 022	38 122	39 709	35 853
German Dem.Rep.	6 398	10 674	7 668	5 816	5 882	2 088	2 430	2 404	1 504	944
Germany Fed.Rep.	4 217	8 665	12 003	20 589	18 622	38 698	26 860	25 982	18 780	11 218
Iceland	97	4	23	5	1	-	-	-	-	-
Ireland	-	-	-	-	-	119	126	88	-	-
Netherlands	18 136	12 532	9 232	14 504	8 917	6 101	7 270	5 135	1 466	235
Norway	15 184	23 256	15 219	9 246	12 483	17 856	14 949	17 627	17 575	44 376
Poland	4	186	7 512	22 203	35 304	35 819	12 378	5 661	6 104	2 404
Spain	-	190	108	308	249	-	-	-	-	-
Sweden	4 523	3 899	1 876	1 187	913	1 271	1 275	990	211	304
UK(Engl.+Wales)	3 162	3 744	3 378	4 353	3 472	6 300	6 822	8 382	6 256	4 877
UK (Scotland)	6 106	10 797	10 834	10 956	8 898	13 034	11 366	14 330	8 257	6 517
USSR	110 200	99 883	83 333	104 500	110 743	83 669	46 385	10 161	2 015	-
Sub-total	217 919	217 767	194 854	231 288	240 397	253 170	188 642	139 511	112 759	117 040
By-Catch from Industrial Fisheries:										
Denmark[a)]	34 700	22 600	24 400	38 800	27 800	53 684	1 805	72	493	-
Norway[a)]		5 434	6 517	3 469	9 878	13 082	4 392	2 494	1 142	363
TOTAL	252 619	245 801	225 771	273 557	278 075	319 936	194 839	142 077	114 394	117 403

*) Preliminary

Table 5.2 North Sea SAITHE (Sub-area IV and Division IIIa).
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	1	1	1	130	1628	626	390	457	4231
2	73	12937	7606	5615	19813	2852	10147	20434	30315
3	13724	11485	15874	15409	19285	57117	68102	40294	47715
4	13270	27279	12787	19025	12488	74994	53348	62533	33780
5	7873	4367	13104	9668	9889	12391	30131	23124	24725
6	1262	3579	2085	5725	6045	10874	3717	20826	15345
7	493	727	1450	571	3952	3779	3874	3635	8058
8	121	272	470	446	730	1996	2682	3113	1798
9	65	193	294	346	489	600	1808	1901	1267
10	57	101	143	164	192	326	403	1110	1025
11	49	78	82	123	62	86	223	265	579
12	20	61	43	70	40	59	51	126	261
13	67	35	19	69	33	26	18	25	81
14	26	34	33	53	23	26	18	68	37
15+	26	55	43	53	13	27	31	49	21
TOTAL	37127	61204	52034	57467	74682	145779	174943	177960	169238

	1974	1975	1976	1977	1978	1979	1980
1	3670	311	228	2586	1237	894	636
2	14750	72546	23125	12993	16970	16959	13271
3	60680	51287	223680	22567	29504	10067	11928
4	31803	23585	51407	51801	27679	14756	14357
5	12431	9028	9852	12914	17251	12843	9421
6	20595	6717	5111	4684	3787	6878	6007
7	14504	12660	3309	3173	1162	2641	4224
8	5028	8656	4842	2902	1069	873	934
9	1427	3299	2978	3466	707	470	703
10	809	1100	1068	1895	736	282	349
11	412	616	420	875	640	402	536
12	222	254	253	342	415	343	230
13	132	275	121	341	213	157	160
14	30	77	161	123	95	154	104
15+	27	25	66	129	108	101	384
TOTAL	166520	190436	326621	120791	101573	67820	63244

Table 5.3 North Sea SAITHE.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
2	0.00	0.10	0.07	0.02	0.06	0.01	0.06	0.13	0.18
3	0.13	0.14	0.14	0.19	0.08	0.16	0.28	0.34	0.48
4	0.53	0.41	0.23	0.29	0.23	0.50	0.37	0.44	0.53
5	0.52	0.33	0.36	0.28	0.24	0.38	0.38	0.27	0.31
6	0.29	0.48	0.26	0.26	0.28	0.45	0.19	0.50	0.29
7	0.20	0.27	0.36	0.10	0.29	0.28	0.29	0.29	0.37
8	0.11	0.16	0.29	0.18	0.19	0.23	0.34	0.39	0.22
9	0.09	0.25	0.26	0.35	0.30	0.23	0.33	0.42	0.28
10	0.11	0.19	0.30	0.22	0.34	0.34	0.24	0.35	0.42
11	0.10	0.22	0.23	0.45	0.12	0.25	0.41	0.25	0.31
12	0.08	0.17	0.18	0.31	0.26	0.17	0.23	0.43	0.41
13	0.35	0.20	0.07	0.49	0.24	0.27	0.07	0.17	0.55
14	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40
F(5-10),U	0.22	0.28	0.30	0.23	0.27	0.32	0.30	0.37	0.32

	1974	1975	1976	1977	1978	1979	1980
1	0.01	0.00	0.00	0.02	0.02	0.01	0.00298
2	0.08	0.16	0.16	0.11	0.18	0.30	0.12
3	0.66	0.40	0.98	0.22	0.37	0.16	0.35
4	0.69	0.59	0.93	0.64	0.47	0.32	0.35
5	0.38	0.42	0.52	0.64	0.46	0.42	0.35
6	0.47	0.37	0.45	0.51	0.39	0.33	0.35
7	0.50	0.60	0.31	0.57	0.22	0.52	0.35
8	0.42	0.63	0.48	0.49	0.38	0.26	0.35
9	0.28	0.53	0.46	0.78	0.21	0.28	0.35
10	0.28	0.36	0.33	0.60	0.37	0.12	0.35
11	0.30	0.36	0.22	0.49	0.42	0.35	0.35
12	0.19	0.31	0.25	0.28	0.46	0.42	0.35
13	0.38	0.38	0.24	0.62	0.29	0.31	0.35
14	0.40	0.40	0.40	0.40	0.35	0.35	0.35
15+	0.40	0.40	0.40	0.40	0.35	0.35	0.35
F(5-10),U	0.39	0.48	0.43	0.60	0.34	0.32	0.35

Table 5.4 North Sea SAITHE.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	191400	155288	419182	431491	465666	243357	232946	245972	276485
2	116172	156704	127138	343196	355158	379784	198678	190368	200972
3	123355	95047	116630	97229	275914	271262	308365	153506	137439
4	35344	88624	67468	82985	65729	208501	188652	191232	89485
5	21244	17054	48084	43732	50838	42577	103518	106559	100492
6	5455	10342	10040	27600	27112	32725	23737	57707	66449
7	3029	3332	5260	6344	17447	16762	17043	16087	28589
8	1300	2036	2074	3004	4679	10731	10326	10471	9903
9	862	956	1422	1276	2058	3174	6990	6045	5779
10	592	647	609	900	734	1245	2059	4099	3244
11	576	434	439	370	589	428	727	1323	2359
12	278	428	285	285	193	426	273	395	845
13	249	209	295	195	171	122	296	178	210
14	110	144	140	224	97	110	76	226	123
15+	110	233	182	224	55	114	131	163	70
TOTAL	500078	531478	799247	1039055	1264440	1211320	1093817	984331	922444
SPAWN. ST.	33807	35815	68829	84155	105973	108415	165176	203252	218063

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1978
1	681586	215619	173385	139351	90205	158826	235815	******	282995
2	222546	554721	176253	141750	111756	72736	129228	192495	233800
3	137240	168898	388803	123469	104339	76215	44307	93839	178678
4	69762	58140	92262	119473	80778	58937	53329	25563	102745
5	43017	28711	26501	29801	51515	41326	34994	30768	50974
6	60057	24061	15408	12874	12856	26711	22313	20190	27601
7	40609	30711	13668	8032	6544	7126	15690	12874	15233
8	16172	20253	13820	8217	3737	4148	3469	9052	8337
9	6489	8730	8845	6976	4127	2100	2611	2002	4552
10	3592	4030	4193	4570	2620	2742	1296	1507	2367
11	1736	2214	2312	2474	2047	1484	1991	748	1288
12	1411	1051	1259	1515	1241	1102	854	1149	706
13	457	955	632	803	933	644	594	493	408
14	100	256	535	409	353	572	386	343	207
15+	90	83	219	429	401	375	1426	1046	179
TOTAL	1284865	1118431	918094	600142	475251	455046	548307		
SPAWN. ST.	173731	121054	87391	76099	86173	88331	85627		

Table 5.5 North Sea SAITHE (Div. IIIa + Sub-area IV)
Mean Weight at Age

Age	Mean Weight (kg)		
	1960-78	1979	1980
1	.30	.43	.36
2	.45	.41	.46
3	.75	.93	.97
4	1.16	1.56	1.66
5	1.79	2.24	2.26
6	2.48	3.06	2.91
7	3.38	3.92	4.13
8	4.20	5.12	5.36
9	4.91	6.07	5.88
10	5.65	6.47	6.90
11	6.45	6.97	7.65
12	7.16	7.59	7.78
13	8.07	8.26	8.09
14	9.00	8.14	8.18
15+	9.00	8.82	9.29

Number of Ascrudia

Table 5.6 North Sea SAITHE

Calculation of total international fishing effort, 1976-1980.

Year	Effort of French distant water trawlers days fishing x 100 hp weighted by area	Catch of French distant water trawlers (tonnes)	Total international catch (tonnes)	Effort relative to 1980
1976	81 249	29 931	319 936	2.8
1977	88 260	40 024	194 839	1.7
1978	57 727	29 738	142 077	1.1
1979	73 658	39 619	114 394	0.8
1980	74 094	34 736	117 403	1.0

Table 5.7 North Sea SAITHE
Spawning stock biomass ('000tonnes) at the beginning of each year and recruitment (estimates) from VPA of population size (millions) at 1 year old of each year class.

Year/ Year class	Spawning stock biomass (age groups 5-15+)	Recruitment Size 1
1961	50	81
1962	47	196
1963	60	141
1964	66	192
1965	84	155
1966	95	419
1967	158	431
1968	202	465
1969	259	243
1970	290	234
1971	401	245
1972	501	276
1973	554	681
1974	509	215
1975	398	173
1976	292	139
1977	247	90
1978	232	159
1979	286	-
1980	295	-

Table 5.8 North Sea SAITHE
Input data for Catch Prediction

Age Group	Stock Number 1981 (thousands)	Relative Fishing Mortality	Average Weight (kg)
1	236 000*)	0.00851	.36
2	192 495*)	0.342	.46
3	93 839	1.0	.97
4	25 563	1.0	1.66
5	30 768	1.0	2.26
6	20 190	1.0	2.91
7	12 874	1.0	4.13
8	9 052	1.0	5.36
9	2 002	1.0	5.88
10	1 507	1.0	6.90
11	748	1.0	7.65
12	1 149	1.0	7.78
13	493	1.0	8.09
14	343	1.0	8.18
15+	511	1.0	9.29

*Average recruitment at age 1 for year classes 1959-1977.

150 000 level in near fu

Table 5.9 North Sea SAITHE
Catch and Biomass Prediction

Year	Spawning stock biomass 1 January	$\bar{F}_{5-10}$	Landings
1980	286	.35	118
1981	278	.35	120
1982	233	.35	132
1983	237	.35	146

$\bar{F}_{82}/\bar{F}_{80}$	$\bar{F}_{5-10}$ in 1982	Landings 1982	Spawning Stock Biomass January 1983
0.1	0.035	0	337
0.2	0.07	30	314
0.5	0.17	71	283
0.75	0.26	103	259
1.0	0.35	132	237
1.5	0.52	185	199
2.0	0.70	229	167

F_{max} 0,24

Table 6.1. Nominal catch (tonnes) of SAITHE in Division Va, 1971-1980.
(Data for 1971-1979 from Bulletin Statistique.)

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980*
Belgium	3 490	2 250	2 131	2 371	1 638	1 615	1 448	1 092	980	673
Faroe Islands	2 046	857	1 467	1 712	1 366	3 267	3 013	4 250	5 457	4 931
France	3 987	-	-	94	32	51	-	-	-	-
German Dem.Rep.	2 637	3 471	-	-	-	-	-	-	-	-
Germany, Fed.Rep.of	40 628	30 918	38 565	18 627	13 820	13 785	10 575	-	-	-
Iceland	60 080	59 945	56 567	65 169	61 430	56 811	46 973	44 327	57 066	52 171
Norway	-	-	-	-	6	5	4	3	1	1
Poland	113	150	-	-	-	-	-	-	-	-
Spain	59	-	-	-	-	-	-	-	-	-
U.K. (England & Wales)	21 767	13 152	11 874	8 845	8 643	6 024	13	-	-	-
U.K. (Scotland)	1 743	545	509	731	1 021	443	-	-	-	-
USSR	5	-	-	-	-	-	-	-	-	-
Total	136 555	111 288	111 113	97 549	87 956	82 001	62 026	49 672	62 504	57 776

Table 6.2 Icelandic SAITHE.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
2	41	31	196	1	20	18	7	49	25
3	2003	940	1116	836	1572	287	476	565	219
4	4825	2090	3400	2605	4395	5622	3031	3786	1768
5	7589	3283	5591	3563	5706	4999	10221	6524	5155
6	2158	4117	4326	6318	6518	6126	6736	8646	7077
7	1324	1285	4931	3207	9136	6178	6694	4178	7372
8	642	739	1200	3008	2796	5934	5045	3320	2616
9	353	390	550	621	1843	1689	4272	2098	1635
10	164	235	330	343	461	1191	959	1421	871
11	102	133	169	215	100	299	887	361	412
12	85	69	73	103	110	171	549	328	231
13	81	102	104	79	32	92	96	79	80
14	52	73	65	41	44	70	63	68	22
15+	54	93	126	95	32	86	131	73	23
TOTAL	19473	13580	22177	21035	32765	32762	38967	31496	27506

	1974	1975	1976	1977	1978	1979	1980
2	111	16	29	5	0	0	0
3	1269	526	329	59	548	480	133
4	3404	2997	3234	2099	1145	3764	2281
5	2348	2479	3045	2858	2435	1991	4587
6	3164	1829	2530	1801	1556	3616	2526
7	3452	3496	2154	1036	1275	1566	2396
8	3384	2994	2367	1068	961	718	1596
9	1303	1434	1530	1528	537	292	478
10	824	710	1064	958	575	669	243
11	351	325	295	538	476	589	151
12	141	176	191	166	279	489	102
13	43	100	94	71	139	150	58
14	13	36	68	12	91	72	29
15+	20	61	18	49	55	0	22
TOTAL	19827	17179	16948	12248	10072	14396	14582

Table 6.3 Icelandic SAITHE.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.02	0.01	0.02	0.02	0.02	0.00	0.01	0.02	0.01
4	0.13	0.03	0.07	0.05	0.10	0.09	0.07	0.11	0.10
5	0.23	0.13	0.11	0.09	0.16	0.17	0.24	0.20	0.21
6	0.24	0.18	0.24	0.17	0.25	0.25	0.35	0.33	0.34
7	0.27	0.22	0.35	0.28	0.40	0.40	0.48	0.39	0.51
8	0.24	0.24	0.32	0.37	0.43	0.48	0.67	0.46	0.45
9	0.23	0.22	0.29	0.27	0.41	0.50	0.79	0.66	0.44
10	0.19	0.23	0.30	0.29	0.33	0.50	0.60	0.67	0.64
11	0.18	0.23	0.26	0.32	0.13	0.37	0.90	0.47	0.41
12	0.16	0.17	0.19	0.25	0.27	0.34	1.02	1.06	0.63
13	0.15	0.29	0.43	0.32	0.12	0.39	0.32	0.68	0.83
14	0.20	0.20	0.30	0.30	0.30	0.40	0.50	0.40	0.40
15+	0.20	0.20	0.30	0.30	0.30	0.40	0.50	0.40	0.40
F(5-10),U	0.23	0.20	0.27	0.25	0.33	0.38	0.52	0.45	0.43

	1974	1975	1976	1977	1978	1979	1980
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.06	0.02	0.01	0.00	0.01	0.02	0.0046
4	0.22	0.19	0.15	0.09	0.07	0.12	0.10
5	0.18	0.24	0.30	0.20	0.15	0.16	0.20
6	0.20	0.21	0.42	0.29	0.16	0.34	0.30
7	0.28	0.35	0.41	0.30	0.35	0.24	0.40
8	0.47	0.42	0.42	0.37	0.51	0.34	0.40
9	0.42	0.37	0.40	0.54	0.32	0.28	0.40
10	0.42	0.42	0.53	0.46	0.40	0.86	0.40
11	0.59	0.29	0.31	0.56	0.44	0.93	0.40
12	0.24	0.67	0.27	0.29	0.64	1.18	0.40
13	0.23	0.27	0.97	0.15	0.42	0.87	0.40
14	0.30	0.30	0.30	0.30	0.30	0.40	0.40
15+	0.30	0.30	0.30	0.30	0.30	0.40	0.40
F(5-10),U	0.33	0.34	0.41	0.36	0.31	0.37	0.35

Table 6.4 Iceland SAITHE.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
2	85894	84628	73957	107652	77741	60262	31789	28950	30007
3	95139	70287	69259	60373	88137	63631	49522	26020	23658
4	42821	76085	56697	55697	48675	70741	51837	39952	20794
5	41400	30709	60406	43352	43250	35888	52847	39706	29296
6	11291	27066	22183	44415	32280	30269	24879	34071	26634
7	6055	7303	18452	14270	30672	20565	19271	14320	20127
8	3324	3767	4822	10678	8800	16913	11293	9779	7974
9	1898	2144	2419	2870	6042	4697	8530	4739	5030
10	1051	1236	1404	1486	1791	3293	2332	3174	2005
11	691	713	800	853	908	1052	1629	1052	1329
12	641	474	464	503	505	654	593	544	537
13	630	448	326	314	319	315	381	176	154
14	315	443	275	174	186	233	175	226	73
15+	328	564	534	402	136	286	304	243	76
TOTAL	291479	305867	312000	343040	339443	308798	255244	202950	167695
SPAWN. ST.	26225	44158	51680	75966	81640	78276	69449	68323	63941

	1974	1975	1976	1977	1978	1979	1980	1981	1970-1978
2	37973	39275	29799	57632	40034	39050	0	*****	39525
3	24545	30990	32142	24371	47180	32777	31972	0	35762
4	19171	18951	24897	26018	19900	38133	26402	26056	32473
5	15430	12632	12817	17470	19409	15260	27827	19559	26166
6	19345	10518	8112	7756	11730	13696	10700	18653	19257
7	15450	12990	6965	4372	4731	8202	7966	6490	13199
8	9875	9546	7495	3770	2648	2729	5306	4372	8810
9	4183	5052	5130	4013	2128	1307	1589	2912	4833
10	2652	2256	2849	2827	1918	1260	808	872	2589
11	863	1432	1210	1379	1456	1054	436	443	1267
12	719	393	880	725	648	765	339	239	633
13	234	462	164	549	445	281	193	186	320
14	55	152	288	51	385	239	96	106	182
15+	85	258	76	208	233	0	73	93	203
TOTAL	150579	144906	132824	151142	152845	154754	113706		
SPAWN. ST.	53460	43058	33169	25651	26322	29533	27505		

Table 6.5 Iceland SAITHE
Spawning stock biomass ('000 tonnes) at the beginning of each year and recruitment estimates from VPA of population size (millions) at 1 year old of each year class. (Estimates of year class strength of the most recent year classes are less reliable.)

Year/Year class	Spawning stock biomass (6-15+)	Recruitment
1960	120	126
1961	130	83
1962	147	142
1963	155	105
1964	142	104
1965	155	90
1966	237	132
1967	283	95
1968	398	73
1969	446	39
1970	443	35
1971	403	37
1972	376	46
1973	354	48
1974	321	37
1975	280	71
1976	226	49
1977	177	
1978	167	
1979	172	
1980	145	

Table 6.6 Icelandic SAITHE
Weight at age, Icelandic landings in 1979 and 1980.

Age	1979[1)]	1980	Previously used by WG [2)]
3	1.12	1.44	1.12
4	1.76	1.89	1.96
5	2.73	2.68	3.05
6	4.29	3.87	4.34
7	5.54	5.32	5.38
8	7.27	6.14	6.55
9	8.42	6.84	7.64
10	9.41	8.23	8.63
11	10.00	9.06	9.52
12	10.56	9.30	10.29
13	11.87	10.50	10.97
14	13.12	11.37	11.55
15+	-	12.50	12.80

1) Used for calculation of spawning stock biomass in 1974-79.

2) Used for calculation of spawning stock biomass 1961-73.

Table 6.7 Icelandic SAITHE.
Input data for catch predictions.

Age group	Stock number 1981 ('000)	Relative fishing mortality	Average weight (kg)
3	32 000	0.0286	1.44
4	26 362	0.286	1.89
5	19 559	0.57	2.68
6	18 653	0.86	3.87
7	6 490	1.14	5.32
8	4 372	1.14	6.14
9	2 912	1.14	6.84
10	872	1.14	8.23
11	443	1.14	9.06
12	239	1.14	9.30
13	186	1.14	10.50
14	106	1.14	11.37
15+	93	1.14	12.50

Recruitment of 1977, 1978 and 1979 year classes is based on the average for year classes 1968-76.

Table 6.8 Icelandic SAITHE
Catch and biomass predictions ('000 tonnes)

Year	Spawning stock biomass 1 January	$\bar{F}_{5-10}$	Landings	Total stock biomass
1980	145	0.35	58	316
1981	171	0.35	60	320
1982	173	0.35	62	320

$\bar{F}_{82}/\bar{F}_{80}$	$\bar{F}_{5-10}$ in 1982	Landings 1982	Total biomass 1983	SSB 1983
0.1	.035	7	378	226
0.2	.07	14	370	219
0.5	.175	33	348	199
0.8	.28	51	328	181
0.9	.315	57	322	175
1.0	.35	62	316	170
1.2	.42	72	305	159
1.5	.525	86	288	145

Table 7.1 Nominal catch (tonnes) of SAITHE in Division Vb, 1971-1980

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980*)
Belgium	-	-	-	-	-	6	-	-	-	-
Faroe Islands	5 653	5 646	2 973	3 726	2 517	2 560	5 153	15 892	22 003	24 223
France	12 394	24 006	22 676	20 457	23 980	15 367	17 038	8 128	2 974	1 037
German Dem. Rep.	-	-	-	130	26	-	-	-	-	-
Germany,Fed.Rep.	2 254	3 440	9 329	6 661	5 229	2 605	3 086	1 088	581	193
Netherlands	63	-	-	-	491	232	58	-	-	+
Norway	1 839	470	355	1 660	486	2 232	1 279	1 124	1 137	64
Poland	-	-	4 050	1 925	815	1 007	-	-	-	+
Spain	-	423	390	500	654	117	-	-	-	-
UK(Engl.&Wales)	3 305	2 453	7 527	3 827	2 428	3 063	2 613	557	190	13
UK(Scotland)	7 198	6 225	10 131	8 302	4 950	5 860	5 608	1 349	361	38
USSR	-	-	-	-	-	16	-	-	-	-
Total	32 706	42 663	57 431	47 188	41 576	33 065	34 835	28 138	27 246	25 568

*) Preliminary

Table 7.2 Faroe SAITHE.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0	0	2	0	0	2	0	0	4
2	112	68	154	222	55	774	723	217	1650
3	996	488	595	614	1191	1445	2857	2714	2515
4	850	1540	796	1689	2086	6277	3316	1774	6253
5	1708	1201	1364	1116	2294	1558	5585	2588	7075
6	965	1686	792	1095	1414	1478	1005	2742	3478
7	510	806	1192	548	1118	899	828	1529	1634
8	407	377	473	655	589	730	469	1305	693
9	306	294	217	254	580	316	526	1017	550
10	201	205	190	128	239	241	164	743	403
11	156	156	97	89	115	86	100	330	215
12	120	94	75	59	100	48	54	133	103
13	89	52	38	40	56	46	13	28	25
14	30	34	11	29	30	15	18	28	21
15+	46	45	16	59	24	23	15	21	37
TOTAL	6496	7046	6012	6597	9871	13938	15473	15169	24656

	1974	1975	1976	1977	1978	1979	1980
1	5	0	1	0	0	0	0
2	133	189	148	124	20	1	430
3	3504	2062	3178	1609	611	287	1009
4	4126	3361	3217	2937	1743	933	889
5	4011	3801	1720	2034	1736	1341	750
6	2784	1939	1250	1288	548	1033	682
7	1401	1045	877	767	373	584	736
8	640	714	641	708	479	414	288
9	368	302	468	498	466	247	215
10	340	192	223	338	473	473	173
11	197	193	141	272	407	368	199
12	124	126	96	129	211	206	158
13	45	64	60	80	146	136	264
14	44	41	54	57	95	98	135
15+	52	67	77	64	83	251	240
TOTAL	17774	14096	12151	10905	7391	6372	6148

Table 7.3 Faroe SAITHE.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.01	0.00	0.01	0.00	0.00	0.02	0.02	0.01	0.08
3	0.05	0.03	0.03	0.03	0.03	0.04	0.09	0.09	0.12
4	0.09	0.11	0.06	0.10	0.14	0.24	0.13	0.07	0.31
5	0.18	0.17	0.13	0.11	0.19	0.14	0.34	0.14	0.46
6	0.24	0.27	0.16	0.15	0.19	0.18	0.13	0.28	0.29
7	0.25	0.33	0.31	0.16	0.22	0.18	0.14	0.30	0.26
8	0.26	0.30	0.33	0.28	0.26	0.22	0.13	0.34	0.21
9	0.35	0.30	0.28	0.29	0.42	0.22	0.15	0.47	0.24
10	0.28	0.41	0.32	0.26	0.49	0.31	0.17	0.57	0.35
11	0.35	0.36	0.35	0.25	0.40	0.33	0.20	0.58	0.32
12	0.66	0.36	0.29	0.37	0.49	0.29	0.35	0.46	0.36
13	0.44	0.69	0.25	0.25	0.41	0.43	0.12	0.31	0.14
14	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40
15+	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.40	0.40
F(5-10),U	0.26	0.30	0.25	0.21	0.29	0.21	0.18	0.35	0.30

	1974	1975	1976	1977	1978	1979	1980
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.01	0.01	0.01	0.02	0.00	0.00	0.01
3	0.23	0.16	0.20	0.18	0.12	0.08	0.10
4	0.30	0.36	0.39	0.29	0.30	0.27	0.35
5	0.34	0.50	0.31	0.45	0.27	0.39	0.35
6	0.33	0.28	0.30	0.40	0.21	0.26	0.35
7	0.18	0.19	0.19	0.30	0.19	0.36	0.30
8	0.16	0.13	0.18	0.24	0.31	0.34	0.30
9	0.17	0.10	0.12	0.20	0.24	0.26	0.30
10	0.23	0.12	0.10	0.12	0.30	0.41	0.30
11	0.29	0.19	0.12	0.18	0.21	0.40	0.30
12	0.30	0.30	0.14	0.16	0.20	0.15	0.30
13	0.26	0.25	0.23	0.16	0.27	0.19	0.30
14	0.40	0.40	0.35	0.35	0.30	0.30	0.30
15+	0.40	0.40	0.35	0.35	0.30	0.30	0.30
F(5-10),U	0.23	0.22	0.20	0.29	0.25	0.34	0.32

Table 7.4 Faroe SAITHE.
S+ size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	37493	33959	62256	56612	56398	51783	36370	30438	23664
2	24158	30096	27803	50969	46350	46175	42395	29777	24920
3	21330	19678	25071	22624	41530	37898	37106	34057	24183
4	11261	16564	15670	19989	17969	32926	29724	27802	25436
5	11514	8453	12173	12111	14842	12831	21510	21347	21162
6	4929	7889	5839	8737	8909	10086	9101	12430	15145
7	2526	3167	4942	4067	6166	6021	6926	6546	7711
8	1904	1610	1869	2975	2830	4042	4120	4925	3985
9	1147	1242	979	1105	1847	1792	2653	2950	2860
10	915	664	753	606	677	992	1183	1878	1504
11	583	569	360	446	381	340	595	821	873
12	270	337	326	208	285	209	201	397	377
13	273	114	192	199	117	144	128	116	206
14	127	144	47	123	127	64	76	93	70
15+	195	191	68	250	102	97	64	70	123
TOTAL	118686	125276	158347	181021	198535	205401	191951	173647	152219
SPAWN. ST.	24445	24380	27547	30827	36290	36618	46357	51573	54015

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1978
1	29029	16485	9074	6516	17424	58228	0	*****	33393
2	19371	23763	13497	7428	5335	14266	47673	0	28045
3	18914	15740	19284	10917	5970	4350	11679	38643	23879
4	17532	12332	11029	12927	7489	4337	3302	8652	18475
5	15206	10646	7079	6142	7944	4564	2712	1905	13054
6	10983	8847	5310	4250	5205	4943	2553	1564	8261
7	9273	6491	5499	3224	2324	2131	3118	1462	5349
8	4844	6330	4373	3713	1950	1567	1220	1891	3538
9	2639	3389	4539	3003	2403	1166	911	740	2325
10	1847	1829	2502	3295	2010	1548	733	552	1475
11	869	1206	1324	1848	2393	1221	843	444	901
12	521	535	814	957	1268	1593	669	511	479
13	216	315	325	580	667	848	1118	406	257
14	146	136	201	212	402	415	572	678	141
15+	173	223	286	238	352	1063	1017	963	174
TOTAL	131563	108266	85136	65248	61135	102238	78099		
SPAWN. ST.	46716	39946	32252	27460	24917	21058	15445		

Table 7.5 Faroe SAITHE.
Mean weight (kg) at age data for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.759	0.817	0.858	0.900	0.860	0.754	0.690	0.910	0.827
3	1.181	1.361	1.273	1.302	1.188	1.244	1.101	1.043	1.088
4	2.125	2.026	1.780	1.737	1.667	1.445	1.316	1.485	1.461
5	2.941	3.055	2.534	2.036	2.302	2.249	1.818	2.055	1.582
6	4.096	3.658	3.572	3.120	2.853	2.853	2.978	2.829	2.249
7	4.878	4.585	4.368	4.049	3.673	3.515	3.702	3.791	3.687
8	5.932	5.520	5.313	5.183	5.002	4.418	4.271	4.175	4.385
9	6.321	6.837	5.812	6.238	5.714	5.444	5.388	4.808	5.128
10	7.288	7.265	6.554	7.520	6.405	5.733	5.972	5.294	5.276
11	8.074	7.062	7.806	8.049	6.554	6.662	6.490	6.948	6.727
12	7.878	8.123	7.591	8.654	7.591	7.310	7.173	6.727	7.311
13	9.479	10.210	8.551	8.298	7.951	9.047	7.380	7.591	8.148
14	9.617	9.728	7.878	9.254	8.373	9.073	9.288	9.315	7.951
15+	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000

	1974	1975	1976	1977	1978	1979	1980
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.928	0.749	0.653	0.817	0.448	0.000	0.000
3	1.430	1.114	1.088	1.223	1.493	1.220	1.250
4	1.525	1.658	1.676	1.641	2.324	1.880	2.210
5	2.207	2.260	2.878	2.660	3.068	2.620	3.320
6	2.500	3.120	3.081	3.790	3.746	3.400	4.280
7	3.120	3.557	4.287	4.239	4.913	4.180	5.160
8	4.601	4.096	4.352	5.597	4.368	4.950	6.420
9	5.559	5.128	4.790	5.350	5.276	5.690	6.870
10	5.714	6.094	5.912	5.912	5.832	6.380	7.090
11	6.259	7.196	6.619	6.837	6.053	7.020	7.950
12	6.881	7.782	6.619	6.727	6.706	7.620	8.070
13	7.758	8.602	7.311	6.948	7.686	8.150	8.590
14	9.100	8.810	7.806	8.424	7.219	8.640	9.790
15+	10.000	10.000	10.000	10.000	10.000	10.000	10.340

Table 7.6 Faro ITHE.
Catch weight (tonnes) and SOP check.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0	0	0	0	0	0	0	0	0
2	85	56	132	200	47	584	499	197	1365
3	1176	664	757	799	1415	1798	3146	2831	2736
4	1806	3120	1417	2934	3477	9070	4364	2634	9136
5	5023	3669	3456	2272	5281	3504	10154	5318	11193
6	3953	6167	2829	3416	4034	4217	2993	7757	7822
7	2488	3696	5207	2219	4106	3160	3065	5796	6025
8	2414	2081	2513	3395	2946	3225	2003	5448	3039
9	1934	2010	1261	1584	3314	1720	1756	4890	2820
10	1465	1489	1245	963	1531	1382	979	3933	2126
11	1260	1195	757	716	754	573	649	2293	1446
12	945	764	569	511	759	351	387	895	753
13	844	531	325	332	286	416	96	213	204
14	289	331	87	268	251	136	167	261	167
15+	460	450	160	590	240	230	150	210	370
A) SOP	24142	26223	20716	20199	28442	30365	30408	42677	49201
B) NOMINAL	22181	25563	21519	20387	27437	29110	32706	42186	57574
(B/A) IN %	92	97	103	101	96	96	108	99	117

	1974	1975	1976	1977	1978	1979	1980
1	0	0	0	0	0	0	0
2	123	142	97	101	9	0	0
3	5011	2297	3458	1968	912	350	1241
4	6292	5573	5392	4820	4051	1754	1965
5	8852	8590	4950	5410	5326	3513	2424
6	6960	6050	3851	4882	2053	3512	2919
7	4371	3717	3760	3251	1833	2441	3798
8	2945	2925	2790	3963	2092	2049	1849
9	2046	1549	2242	2664	2459	1405	1477
10	1943	1170	1318	1998	2759	3018	1227
11	1233	1389	933	1860	2464	2583	1578
12	853	981	635	868	1415	1570	1275
13	349	551	439	556	1122	1108	2268
14	400	361	422	480	686	847	1322
15+	520	670	770	640	830	2510	2482
A) SOP	41899	35963	31056	33461	28009	26662	25823
B) NOMINAL	47188	41578	33067	34835	28135	27246	25568
(B/A) IN %	113	116	106	104	100	102	99

Table 7.7 Faroe SAITHE.
Spawning stock biomass ('000 tonnes) at the beginning of each year and recruitment numbers (millions) as 1 year old of each year class.

Year/year class	Spawning stock biomass (5-15+)	Recruitment
1960	56	31
1961	77	22
1962	82	32
1963	87	30
1964	93	37
1965	105	34
1966	103	62
1967	102	57
1968	106	56
1969	119	51
1970	119	36
1971	138	30
1972	159	24
1973	148	29
1974	151	16
1975	148	9
1976	137	7
1977	130	17
1978	115	
1979	104	
1980	93	

Table 7.8 Faroe SAITHE
Input data for catch predictions.

Age group	Stock number 1981 ('000) 1)	Stock number 1981 ('000) 2)	Relative fishing mortality 1)	Relative fishing mortality 2)	Average weight (kg)
1					
2	16 375		.044	.091	0.80
3	27 545	13 195	.315		1.23
4	8 652		1.104		2.21
5	1 905		1.104		3.32
6	1 564		1.104		4.28
7	1 462		0.946		5.16
8	1 891		0.946		6.42
9	740		0.946		6.87
10	552		0.946		7.09
11	444		0.946		7.93
12	511		0.946		8.07
13	406		0.946		8.59
14	678		0.946		9.79
15+	963		0.946		10.34

1) Assuming high recruitment of the 1978 year class as 1 year old (40×10^6).

2) Assuming low recruitment of the 1978 year class as 1 year old (20×10^6).

Table 7.9 Faroe SAITHE. Catch and Biomass Predictions (1 000 tonnes)

Assumption	1978 Year class at age 1	$\bar{F}$		Landings		Total Biomass			SSB		
		1980	1981	1980	1981	1980	1981	1982	1980	1981	1982
1	40.10^6	0.317	0.317	26	25	114	136	137	93	69	63
2	20.10^6	0.317	0.317	26	24	114	118	114	93	69	63
3	20.10^6	0.317	0.350	26	29 (=TAC)	114	118	108	93	69	58

$\bar{F}_{82}/\bar{F}_{80}$	$\bar{F}_{5-10}$	Assumption 1			Assumption 2			Assumption 3		
		Landings 1982	Total Biomass 1983	SSB 1983	Landings 1982	Total Biomass 1983	SSB 1983	Landings 1982	Total Biomass 1983	SSB 1983
0	0	0	168	114	0	138	85	0	133	80
0.2	.064	6.6	160	107	5	132	80	5	127	75
0.5	.16	16	149	96	12	124	72	12	119	68
1.0	.32	29	133	82	23	112	61	22	108	57
1.5	.48	41	119	69	32	101	52	30	98	49
2.0	.64	51	107	59	40	92	44	38	89	41

Table 8.1 Nominal catch (tonnes) of SAITHE in Sub-area VI, 1971 - 1980
(Data for 1970 - 1979 from Bulletin Statistique).

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980*
Belgium	29	125	191	209	21	95	-	-	1	-
Denmark	-	-	-	-	-	3	-	-	-	-
Faroe Islands	-	-	4	6	6	7	11	-	14	-
France	12 017	17 718	18 970	22 802	19 946	29 216	19 686	21 519	15 662	19 094
German Dem.Rep.	-	-	-	-	8	3	-	-	-	-
Germany,Fed.Rep.	1 068	350	52	16	481	511	254	604	131	74
Ireland	-	-	-	-	-	375	240	266	246	250 1)
Iceland	1	-	+	-	+	-	-	-	-	-
Netherlands	32	638	67	124	702	547	527	623	256	100
Norway	-	-	2	22	10	17	91	122	20	12
Poland	2	-	394	125	164	91	-	-	-	-
Spain	-	1 302	1 980	1 862	1 882	1 012	346	-	-	-
UK(Engl.&Wales)	1 965	2 268	2 138	1 333	1 571	1 560	2 758	3 193	1 765	1 594
UK(N.Ireland)	24	6	14	3	12	13	9	27	11	9
UK(Scotland)	4 620	6 706	11 330	9 527	6 131	5 807	4 628	5 181	3 602	2 897
USSR	105	112	670	269	15	2 550	-	-	-	-
Total	19 863	29 225	35 812	36 298	30 949	41 807	28 550	31 535	21 708	22 030

*) Preliminary.

1) W.G. Estimate

Table 8.2 West of Scotland SAITHE.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	1	1	1	3	1	1	1	58	27
2	322	98	530	65	413	38	406	5499	1797
3	4654	4157	2829	3221	2445	3431	1470	8703	7777
4	4280	7190	3977	3025	5696	2804	4716	1558	7156
5	2457	1787	2665	1585	1847	2168	2008	1789	1322
6	716	928	371	821	624	719	1151	798	1732
7	380	198	625	196	701	289	493	2502	1148
8	129	55	125	167	130	235	383	600	995
9	97	38	61	38	98	49	318	119	305
10	52	18	39	29	27	68	55	105	253
11	66	18	19	15	22	24	65	20	174
12	8	10	15	9	10	24	23	26	138
13	17	7	11	5	10	14	32	7	42
14	48	7	8	3	5	5	11	5	45
15+	0	0	0	0	0	0	0	0	0
TOTAL	13227	14512	11276	9182	12029	9869	11152	21789	22911

	1974	1975	1976	1977	1978	1979	1980
1	598	20	78	184	38	9	45
2	7701	2277	4399	1591	0298	975	994
3	7044	9119	10454	5127	4386	1864	3264
4	2545	3243	3245	2998	3224	1229	922
5	2536	1147	2454	2146	1741	1183	003
6	593	1107	1477	931	962	724	617
7	803	947	818	756	358	376	457
8	1152	878	026	523	315	159	188
9	730	313	704	394	206	195	89
10	571	207	585	401	400	158	111
11	292	184	474	363	512	169	169
12	210	182	213	144	368	140	137
13	24	203	208	76	292	134	184
14	82	27	221	141	116	109	82
15+	0	0	0	0	0	70	116
TOTAL	25281	19854	25756	15775	19216	7494	8058

Table 8.3 West -- Scotland SAITHE.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.16	0.06
3	0.11	0.14	0.10	0.08	0.07	0.08	0.06	0.24	0.37
4	0.50	0.24	0.19	0.15	0.20	0.11	0.14	0.08	0.32
5	0.27	0.41	0.13	0.11	0.13	0.11	0.11	0.07	0.09
6	0.22	0.15	0.14	0.06	0.06	0.07	0.08	0.06	0.10
7	0.47	0.09	0.14	0.10	0.06	0.03	0.06	0.24	0.11
8	0.18	0.11	0.07	0.05	0.09	0.03	0.06	0.10	0.14
9	0.31	0.07	0.18	0.03	0.04	0.04	0.04	0.02	0.06
10	0.23	0.09	0.10	0.12	0.03	0.03	0.06	0.02	0.06
11	0.51	0.12	0.12	0.05	0.13	0.03	0.04	0.03	0.04
12	0.05	0.13	0.14	0.08	0.04	0.20	0.03	0.02	0.29
13	0.14	0.05	0.21	0.06	0.12	0.08	0.43	0.01	0.04
14	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.11
15+	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.11
F(5-10),U	0.28	0.15	0.13	0.08	0.07	0.05	0.07	0.08	0.09

	1974	1975	1976	1977	1978	1979	1980
1	0.01	0.00	0.00	0.01	0.00	0.00	0.00103
2	0.23	0.06	0.17	0.11	0.49	0.06	0.03
3	0.41	0.46	0.43	0.29	0.49	0.26	0.30
4	0.20	0.31	0.29	0.21	0.31	0.24	0.20
5	0.18	0.13	0.41	0.32	0.18	0.17	0.20
6	0.04	0.11	0.24	0.26	0.23	0.11	0.13
7	0.06	0.11	0.11	0.19	0.15	0.13	0.09
8	0.16	0.08	0.10	0.10	0.11	0.09	0.09
9	0.14	0.06	0.09	0.09	0.05	0.09	0.07
10	0.17	0.06	0.09	0.07	0.12	0.05	0.07
11	0.09	0.07	0.17	0.12	0.11	0.07	0.07
12	0.06	0.08	0.11	0.07	0.17	0.04	0.07
13	0.07	0.08	0.12	0.05	0.21	0.09	0.07
14	0.11	0.11	0.11	0.11	0.11	0.11	0.07
15+	0.11	0.11	0.11	0.11	0.11	0.11	0.07
F(5-10),U	0.12	0.09	0.17	0.17	0.14	0.11	0.11

Table 8.4 West of Scotland SAITHE.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	48529	69457	56893	77232	42622	66508	48615	39436	51007
2	43290	39732	56866	46579	63229	34895	54451	59802	32235
3	49951	35152	32441	46079	38077	51395	28535	44214	27633
4	11854	36700	25034	24009	34821	28969	38983	22036	28370
5	11581	5871	23578	16915	16931	23380	21189	27666	16636
6	3946	7272	3203	16902	12419	12197	17187	15538	21037
7	1105	2586	5118	2288	13097	9605	9337	13033	12001
8	877	564	1939	3627	1697	10091	7603	7200	8419
9	399	602	412	1474	2819	1272	8049	5879	5354
10	276	240	459	282	1173	2219	997	6303	4706
11	182	179	180	340	205	936	1755	767	5066
12	189	90	130	130	265	148	745	1379	610
13	141	148	65	93	99	208	100	589	1105
14	688	100	115	43	72	72	158	53	476
15+	0	0	0	0	0	0	0	0	0
TOTAL	173008	198692	206431	235994	227525	241894	237706	225895	214655
SPAWN. ST.	19384	17651	35198	42095	48776	60128	67121	78407	75410

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1977
1	52668	38824	20800	21868	21980	48500	48228	*****	48805
2	41737	42581	31768	16959	17738	17961	39701	39445	41856
3	24770	27241	32807	22047	12450	8879	13826	31607	35411
4	15641	13422	14127	17484	13442	6263	5593	8386	23958
5	16798	10515	8074	8649	11616	8107	4022	3749	15983
6	12428	11469	7575	4409	5153	7942	5572	2696	11199
7	15662	9820	8392	4873	2772	3353	5850	4006	8224
8	8791	12098	7186	6135	3309	1947	2406	4377	5863
9	5997	6159	9113	5319	4550	2425	1451	1801	4065
10	4108	4252	4760	6826	4000	3539	1809	1108	2815
11	3625	2849	3294	3550	5227	2914	2755	1381	1764
12	3990	2704	2167	2270	2579	3818	2233	2103	1140
13	375	3078	2050	1582	1729	1780	2999	1705	741
14	867	285	2337	1491	1226	1152	1337	2290	520
15+	0	0	0	0	0	740	1891	2464	0
TOTAL	207456	185296	154450	123459	107770	119323	13967		
SPAWN. ST.	72640	63229	54947	45101	42160	37718	3232		

Table 8.5 West of Scotland SAITHE.
Calculation of total international fishing effort, 1971-80.

Year	Tonnes/100 horse power days fished by Lorient trawlers	Total landings	Total effort in Lorient units	Effort relative to 1980
1971	0.26	19 863	76 396	0.97
1972	0.27	29 225	108 241	1.38
1973	0.29	35 812	123 490	1.57
1974	0.32	36 298	113 431	1.44
1975	0.30	30 949	103 163	1.31
1976	0.32	41 807	130 647	1.66
1977	0.28	28 550	101 964	1.30
1978	0.26	31 535	121 288	1.54
1979	0.24	21 708	90 450	1.15
1980	0.28	22 030	78 679	1.00

Table 8.6 West of Scotland SAITHE
Spawning stock biomass ('000 tonnes) and year class abundance (millions of fish at age 1) 1960-80.

Year/Year class	Spawning stock biomass	Recruits at age 1
1960	-	38
1961	31	28
1962	31	75
1963	30	53
1964	36	49
1965	49	69
1966	46	57
1967	80	77
1968	105	43
1969	133	67
1970	170	49
1971	204	39
1972	241	51
1973	256	53
1974	260	39
1975	245	21
1976	232	22
1977	194	22
1978	174	(48)*
1979	209	(48)*
1980	206	-

* Average value for year classes 1960-77

Table 8.7 West of Scotland SAITHE
Input data for catch predictions.

Age group	Stock number 1981 ('000)	Proportional Fishing mortality	Average weight (kg)
1	48 000	0.0096	0.435
2	39 445	0.2593	0.682
3	31 607	2.7778	1.221
4	8 386	1.8519	1.858
5	3 749	1.8519	2.435
6	2 696	1.2037	3.539
7	4 006	0.8333	4.574
8	4 377	0.8333	5.906
9	1 801	0.6481	7.122
10	1 108	0.6481	7.616
11	1 381	0.6481	8.355
12	2 103	0.6481	9.112
13	1 705	0.6481	9.652
14	2 290	0.6481	10.514
15+	2 464	0.6481	10.514

Recruits at age 1 1981 $48 \times 10^{6*}$
1982 $48 \times 10^{6*}$

*Average value for year classes 1960-77.

Table 8.8 Catch predictions - West of Scotland SAITHE

Option 1: $F_{81} = F_{80} = 0.108$

1980	Landings	22
	$\bar{F}_{5-10}$	0.108
	Total biomass	276
	SSB	206
1981	Landings	26
	$\bar{F}_{5-10}$	0.108
	Total biomass	283
	SSB	181
1982	Total biomass	289
	SSB	167

$\bar{F}_{82}/\bar{F}_{80}$	Landings 1982	Total biomass 1983	SSB 1983
0	0	326	191
.2	6	319	187
.5	15	309	181
1.0	28	292	171
1.5	40	278	162
2.0	52	265	154

Table 9.1 Faroe Plateau Cod. Nominal catches by countries, 1968 - 80 (tonnes)

Year	Faroe Islands	France	Germany Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	13 763*)	1 260	1 556	686*)	-	5 620	7 394	-	30 279
1969	15 718*)	2 557*)	395	483	-	5 286	11 231	-	35 670
1970	15 245*)	2 616*)	443	238*)	-	2 236	8 259	-	29 037
1971	12 754*)	1 426*)	580	881*)	-	2 753	7 757	-	26 151
1972	12 143*)	1 462*)	451	266*)	-	2 159	5 175	-	21 656
1973	10 434	1 752*)	310	115	419*)	3 935	5 675	-	22 640
1974	12 541	465	292	446	320	2 879	7 516	20	24 479
1975	22 608	1 531	408	1 353	432	2 538	7 815	90	36 775
1976	28 502	1 535	247	1 282	496	2 179	5 491	67	39 799
1977	28 177	1 450	332	853	-	809	4 071	2	35 694
1978	24 076	183	71	245	-	518	1 460	2	26 555
1979	21 773	133	23	274	-	263	660	-	23 126
1980**)	19 652	29	-	165*)	-	13	451	-	20 310

*) Vb_2 included

**) Preliminary data

Table 9.2 Faroe Bank Cod. Nominal catches by countries, 1968-1980 (tonnes).

Year	Faroe Islands	France	Germany Fed. Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1968	*	1 259	6	-	-	1 476	1 130	-	3 871
1969	*	*	8	-	-	1 431	1 018	-	2 457
1970	-	*	-	*	-	1 471	1 531	-	3 002
1971	-	*	-	*	-	732	1 345	2	2 079
1972	-	*	-	*	-	860	1 308	-	2 168
1973	2 842	*	-	-	*	1 144	1 081	-	5 067
1974	696	86	-	-	-	829	503	40	2 154
1975	378	81	50	-	-	749	804	55	2 117
1976	457	72	+	1	-	877	912	11	2 330
1977	851	219	-	99	-	9	780	-	1 958
1978	4 194	*	-	183	-	2	1 071	-	5 450
1979	1 273	-	-	33	-	-	677	-	1 983
1980**)	873	-	-	*	-	85	257	-	1 215

*) Catches included in Vb_1

**) Preliminary data

Table 9.3 Faroe Plateau COD.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	162	53	127	34	68	35	78	44	213
2	852	1337	1609	1529	878	402	328	875	723
3	3230	970	2690	3322	3106	1163	757	1176	3124
4	2564	2080	860	2663	3300	2172	821	810	1590
5	1416	1339	1706	945	1538	1685	1287	596	707
6	363	606	847	1226	477	752	1451	1021	384
7	155	197	309	452	713	244	510	596	312
8	48	104	64	105	203	300	114	154	227
9	63	33	27	11	92	44	179	25	120
10+	0	0	0	0	0	0	0	0	97
TOTAL	8853	6719	8239	10287	10375	6797	5525	5297	7497

	1974	1975	1976	1977	1978	1979	1980
1	271	97	18	31	160	19	41
2	2161	2584	1497	425	555	575	1129
3	1266	5689	4158	3282	1219	1732	2263
4	1811	2157	3799	6844	2643	1673	1461
5	934	2211	1580	3718	3216	1601	895
6	563	813	1427	788	1041	1906	807
7	452	295	617	1160	268	493	832
8	149	190	273	239	201	134	339
9	141	118	120	134	66	87	42
10+	91	150	186	9	56	38	18
TOTAL	7839	14304	13475	16630	9425	8258	7827

Table 9.4 Faroe Plateau COD.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01
2	0.12	0.09	0.08	0.10	0.11	0.05	0.03	0.05	0.07
3	0.25	0.20	0.25	0.24	0.31	0.21	0.13	0.15	0.23
4	0.45	0.26	0.27	0.42	0.40	0.37	0.22	0.21	0.31
5	0.55	0.46	0.35	0.55	0.46	0.30	0.40	0.25	0.28
6	0.66	0.49	0.59	0.45	0.60	0.43	0.61	0.63	0.25
7	0.52	0.97	0.50	0.74	0.52	0.71	0.58	0.55	0.40
8	0.38	0.80	1.05	0.31	0.91	0.43	0.90	0.35	0.42
9	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
10+	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
F(4- 7),U	0.55	0.54	0.43	0.54	0.49	0.47	0.45	0.41	0.31

	1974	1975	1976	1977	1978	1979	1980
1	0.01	0.00	0.00	0.00	0.01	0.00	0.002
2	0.08	0.08	0.09	0.04	0.05	0.04	0.04
3	0.16	0.31	0.17	0.28	0.17	0.22	0.20
4	0.21	0.43	0.34	0.47	0.39	0.37	0.30
5	0.30	0.41	0.55	0.67	0.42	0.43	0.35
6	0.37	0.46	0.52	0.71	0.40	0.48	0.40
7	0.52	0.34	0.78	1.10	0.56	0.33	0.40
8	0.34	0.44	0.61	0.81	0.56	0.62	0.40
9	0.50	0.50	0.55	0.70	0.55	0.50	0.40
10+	0.50	0.50	0.55	0.70	0.55	0.50	0.40
F(4- 7),U	0.35	0.41	0.55	0.74	0.44	0.40	0.36

Table 9.5 Faroe Plateau COD.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	21880	27797	21216	11397	10610	14425	25914	15357	38552
2	8109	17767	22710	17256	9300	8626	11779	21146	12534
3	15860	5871	13341	17142	12749	6823	6699	9347	16523
4	7701	10080	3934	8502	11046	7647	4539	4803	6593
5	3642	4006	6382	2447	4572	6082	4311	2977	3203
6	817	1714	2079	3693	1158	2365	3466	2374	1901
7	420	344	861	945	1924	521	1262	1540	1031
8	165	205	107	428	370	937	209	577	728
9	175	92	75	31	256	122	498	70	334
10+	0	0	0	0	0	0	0	0	270
TOTAL	58769	67876	70704	61840	51985	47547	58676	58191	81668
SPAWN. ST.	12920	16441	13437	16045	19326	17673	14284	12341	14060

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1977
1	46950	23974	13334	14898	21431	38797	22640	*****	22023
2	31371	38195	19541	10901	12169	17402	31747	18499	17633
3	9609	23735	28940	14648	8541	9463	13728	24973	13945
4	10717	6727	14319	19949	9042	5895	6189	9202	8966
5	3969	7144	3573	8311	10198	5031	3324	3754	4663
6	1987	2410	3865	1690	3483	5465	2683	1918	2271
7	1211	1121	1244	1887	680	1918	2766	1472	1101
8	564	587	653	469	515	317	1127	1518	461
9	392	328	310	290	171	242	140	619	229
10+	253	417	481	19	145	106	60	109	111
TOTAL	107024	104638	86261	73062	66376	84635	84404		
SPAWN. ST.	19093	18734	24446	32615	24234	18973	16288		

Table 9.6 Faroe Plateau COD.
Mean weight (kg) at age data for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380	0.380
2	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060	1.060
3	1.890	1.890	1.890	1.890	1.890	1.890	1.890	1.890	1.890
4	2.920	2.920	2.920	2.920	2.920	2.920	2.920	2.920	2.920
5	4.070	4.070	4.070	4.070	4.070	4.070	4.070	4.070	4.070
6	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300	5.300
7	6.580	6.580	6.580	6.580	6.580	6.580	6.580	6.580	6.580
8	7.850	7.850	7.850	7.850	7.850	7.850	7.850	7.850	7.850
9	9.080	9.080	9.080	9.080	9.080	9.080	9.080	9.080	9.080
10+	10.270	10.270	10.270	10.270	10.270	10.270	10.270	10.270	10.270

	1974	1975	1976	1977	1978	1979	1980
1	0.380	0.380	0.380	0.380	0.394	0.493	0.430
2	1.060	1.060	1.060	1.060	1.112	0.897	0.927
3	1.890	1.890	1.890	1.890	1.385	1.682	1.432
4	2.920	2.920	2.920	2.920	2.140	2.211	2.220
5	4.070	4.070	4.070	4.070	3.125	3.052	3.105
6	5.300	5.300	5.300	5.300	4.363	3.642	3.539
7	6.580	6.580	6.580	6.580	5.927	4.719	4.392
8	7.850	7.850	7.850	7.850	6.348	7.272	6.100
9	9.080	9.080	9.080	9.080	8.715	8.368	7.603
10+	10.270	10.270	10.270	10.270	12.299	13.042	9.668

Table 9.7 FAROE PLATEAU COD.

Estimates of spawning stock biomass at the beginning of each year and year-class strengths of 1-year-old fish.

Year/Year-Class	Spawning Stock Biomass (1 000 tonnes) Age Groups ≥4	Year-Class Strength (millions)
1960	-	26.5
1961	31.7	25.4
1962	29.1	27.7
1963	27.7	10.0
1964	37.8	21.9
1965	47.3	27.8
1966	59.5	21.2
1967	55.7	11.4
1968	64.2	10.6
1969	74.9	14.4
1970	71.5	25.9
1971	63.6	15.4
1972	54.0	38.6
1973	60.7	47.0
1974	76.5	24.0
1975	80.7	13.3
1976	97.9	14.9
1977	120.0	21.4
1978	77.0	(38.8)
1979	(63.0)	-
1980	(54.2)	-

Table 9.8 COD - FAROE PLATEAU (Vb_1)
Input Data for Catch Predictions.

Age Group	Stock Number 1981 (1 000)	Proportional Fishing Mortality	Average Weight (kg)
1	22 640	0.005	0.430
2	18 499	0.100	0.927
3	24 973	0.500	1.432
4	9 202	0.750	2.220
5	3 754	0.875	3.105
6	1 918	1	3.539
7	1 472	1	4.392
8	1 518	1	6.100
9	619	1	7.603
10+	109	1	9.668

Recruits at age 1: 1981 22.64×10^6

1982 22.64×10^6

(Average for year classes 1960-76)

Table 9.9 FAROE PLATEAU COD

Catch and Biomass Predictions (1 000 tonnes)

Option 1

$F_{81} = F_{80}$

Year	Spawning Stock Biomass 1 January	$\bar{F}_{4-7}$	Landings
1980	54	0.36	20.3
1981	60	0.36	23.0
1982	82	0.36	25.7
F_{82}/F_{80}	Landings 1982	$\bar{F}_{4-7}$	Spawning Stock Biomass 1 Jan. 1983
0.2	5.8	0.07	106
0.5	13.9	0.18	97
1.0	25.7	0.36	83
1.5	35.9	0.54	72
2.0	44.7	0.72	62

Option 2

$F_{81} = 0.75\ F_{80}$

Year	Spawning Stock Biomass 1 January	$\bar{F}_{4-7}$	Landings
1980	54	0.36	20.3
1981	60	0.27	17.9
1982	88	0.36	27.4
F_{82}/F_{80}	Landings 1982	$\bar{F}_{4-7}$	Spawning Stock Biomass 1 Jan. 1983
0.2	6.2	0.07	112
0.5	14.8	0.18	102
1.0	27.4	0.36	88
1.5	38.3	0.54	75
2.0	47.6	0.72	65

Option 3

F_{81} to take TAC

Year	Spawning Stock Biomass 1 January	$\bar{F}_{4-7}$	Landings
1980	54	0.36	20.3
1981	60	0.21	14.0
1982	92	0.36	28.7
F_{82}/F_{80}	Landings 1982	$\bar{F}_{4-7}$	Spawning Stock Biomass 1 Jan. 1983
0.2	6.5	0.07	117
0.5	15.5	0.18	106
1.0	28.7	0.36	91
1.5	40.0	0.54	78
2.0	49.7	0.72	67

Table 10.1 Faroe Plateau Haddock. Nominal catches by countries, 1968-80 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep. of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	6 751*)	1 143	36	-	-	2 158	5 783	-	15 871
1969	11 122*)	3 314*)	73	-	-	1 549	6 392	-	22 450
1970	11 791	2 006*)	14	-	-	769	5 428	-	20 008
1971	10 488	790*)	19	-	-	1 896	4 949	-	18 142
1972	8 314	2 660*)	24	-	-	844	2 842	-	14 690
1973	4 931	3 508	46		1 190*)	1 510	3 665	-	14 850
1974	4 538	1 242	70	5	685	1 044	5 572	30	13 186
1975	8 625	2 173	120	56	544	1 505	4 896	383	18 302
1976	12 670	2 472	22	20	448	1 551	6 671	181	24 035
1977	19 806	623	49	46	5	705	3 278	26	24 538
1978	15 539	71*)	8	91	-	48	367	-	16 124
1979	11 258	47*)	2	39	-	35	206	-	11 587
1980**)	13 273	13*)	8	16*)	-	6	171	-	13 487

*) Catches including Vb_2

**) Preliminary estimates

Table 10.2 Faroe Bank Haddock. Nominal catches by countries, 1968-1980 (tonnes).

Year	Faroe Islands	France	Germany Fed.Rep. of	Norway	Poland	UK England	UK Scotland	Others	Total
1968	*	1 143	-	-	-	287	556	-	1 986
1969	*	*	-	-	-	427	423	-	850
1970	-	*	-	-	-	368	993	-	1 361
1971	-	*	-	-	-	427	813	29	1 269
1972	-	*	1	-	-	527	1 267	-	1 795
1973	1 087	*	-	-	*	916	1 123	-	3 126
1974	273	209	-	-	-	573	500	22	1 577
1975	132	125	53	-	-	921	1 182	-	2 413
1976	44	70	+	-	-	733	1 329	-	2 176
1977	273	77	-	11	-	4	650	-	1 015
1978	2 643	*	-	39	-	-	394	-	3 076
1979	714	*	-	-	-	-	102	-	816
1980**	548	*	-	*	-	152	307	-	1 007

*) Catches are included in Vb_1

**) Preliminary estimates

Table 10.3 Faroe HADDOCK.
Input catch in numbers ('000) for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	39	90	70	49	95	57	55	43	709
2	1368	1081	1425	5881	2384	1728	717	750	5300
3	4286	3304	2405	4097	7539	4855	4393	3744	8388
4	5133	4804	2599	2812	4567	6581	4727	4179	1236
5	1443	2710	1785	1524	1565	1624	3267	2706	2786
6	1209	1112	1426	1526	1485	1383	1292	1171	916
7	673	740	631	923	1224	1099	864	696	1051
8	1345	180	197	230	378	326	222	180	150
9	43	54	52	68	114	68	147	113	68
10+	0	0	0	0	0	0	0	0	11
TOTAL	15539	14075	10590	17110	19351	17721	15684	13582	18615

	1974	1975	1976	1977	1978	1979	1980
1	221	110	38	0	0	1	0
2	5633	7337	4396	255	32	1	137
3	2899	7952	7858	4039	1022	1161	55
4	3970	2097	6798	5168	4248	1754	3557
5	451	1371	1251	4918	4054	3341	2467
6	976	247	1189	2128	1841	1850	2384
7	466	352	298	946	717	772	1497
8	535	237	720	443	635	212	630
9	68	419	258	731	243	155	95
10+	147	187	318	855	312	74	82
TOTAL	15366	20309	23124	19483	13104	9321	10904

Table 10.4 Faroe HADDOCK.
Fishing mortalities from VPA (M = 0.2).

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2	0.07	0.06	0.07	0.15	0.09	0.05	0.05	0.03	0.17
3	0.24	0.24	0.19	0.28	0.28	0.27	0.19	0.43	0.46
4	0.48	0.45	0.30	0.36	0.56	0.43	0.46	0.28	0.25
5	0.36	0.50	0.30	0.29	0.36	0.40	0.39	0.52	0.30
6	0.59	0.52	0.54	0.45	0.52	0.61	0.64	0.24	0.33
7	0.96	0.91	0.63	0.83	0.82	0.94	1.03	0.88	0.35
8	2.18	0.75	0.66	0.50	1.02	0.54	0.49	0.62	0.47
9	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
10+	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
F(4- 7),U	0.60	0.59	0.44	0.48	0.56	0.59	0.63	0.48	0.31

	1974	1975	1976	1977	1978	1979	1980
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.12	0.15	0.11	0.01	0.00	0.00	0.00045
3	0.22	0.26	0.24	0.14	0.06	0.06	0.06
4	0.41	0.25	0.36	0.25	0.21	0.14	0.25
5	0.13	0.24	0.23	0.49	0.32	0.26	0.30
6	0.16	0.10	0.34	0.76	0.34	0.23	0.30
7	0.28	0.08	0.17	0.50	0.63	0.23	0.30
8	0.30	0.22	0.24	0.40	0.74	0.39	0.30
9	0.40	0.40	0.40	0.40	0.40	0.40	0.30
10+	0.40	0.40	0.40	0.40	0.40	0.40	0.30
F(4- 7),U	0.25	0.17	0.27	0.50	0.38	0.22	0.29

Table 10.5 Faroe HADDOCK.
Stock size in numbers ('000) from VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	23836	29922	58049	36974	44263	18525	38397	28333	66085
2	22190	19480	24417	47463	30228	36154	15116	31387	23158
3	22396	16933	14974	18705	33560	22598	28040	11729	25020
4	14825	14480	10891	10094	11630	20698	14135	19002	6245
5	5260	7537	7548	6581	5739	5435	11044	7335	11799
6	2969	3011	3743	4575	4018	3293	2992	6110	3582
7	1186	1349	1469	1788	2378	1960	1460	1295	3948
8	1619	373	446	639	641	856	627	428	440
9	120	150	145	189	317	189	409	314	189
10+	0	0	0	0	0	0	0	0	31
TOTAL	94402	93236	121682	127008	132774	109708	112219	105931	140497
SPAWN. ST.	48376	43834	39216	42571	58284	55029	58707	46212	51254

	1974	1975	1976	1977	1978	1979	1980	1981	1965-1977
1	69818	56795	28840	34147	1554	41118	0	*****	41076
2	53465	56963	46401	23578	27957	1273	33663	0	33077
3	15987	38696	40026	34026	19074	22860	1041	27438	24822
4	12965	10480	24528	25701	24218	14694	17669	803	15052
5	4001	7052	6694	13978	16393	16004	10450	11266	7693
6	7156	2869	4540	4355	7037	9778	10098	6338	4093
7	2110	4980	2126	2649	1667	4108	6341	6125	2208
8	2289	1308	3760	1472	1322	724	2669	3846	1146
9	226	1393	858	2430	808	515	402	1619	533
10+	489	622	1057	2842	1037	246	547	455	388
TOTAL	168506	181158	158831	145179	101067	111320	82680		
SPAWN. ST.	45222	67400	83590	87454	71556	68930	49017		

Table 10.6 Faroe HADDOCK.
Mean weight (kg) at age data for VPA.

	1965	1966	1967	1968	1969	1970	1971	1972	1973
1	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
2	0.470	0.470	0.470	0.470	0.470	0.470	0.470	0.470	0.470
3	0.730	0.730	0.730	0.730	0.730	0.730	0.730	0.730	0.730
4	1.130	1.130	1.130	1.130	1.130	1.130	1.130	1.130	1.130
5	1.550	1.550	1.550	1.550	1.550	1.550	1.550	1.550	1.550
6	1.970	1.970	1.970	1.970	1.970	1.970	1.970	1.970	1.970
7	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410
8	2.760	2.760	2.760	2.760	2.760	2.760	2.760	2.760	2.760
9	3.070	3.070	3.070	3.070	3.070	3.070	3.070	3.070	3.070
10+	3.550	3.550	3.550	3.550	3.550	3.550	3.550	3.550	3.550

	1974	1975	1976	1977	1978	1979	1980
1	0.300	0.300	0.300	0.000	0.000	0.000	0.000
2	0.470	0.470	0.470	0.311	0.357	0.357	0.643
3	0.730	0.730	0.730	0.633	0.790	0.672	0.713
4	1.130	1.130	1.130	1.044	1.035	0.894	0.941
5	1.550	1.550	1.550	1.426	1.398	1.156	1.157
6	1.970	1.970	1.970	1.852	1.870	1.590	1.493
7	2.410	2.410	2.410	2.241	2.350	2.070	1.739
8	2.760	2.760	2.760	2.205	2.597	2.525	2.095
9	3.070	3.070	3.070	2.570	3.014	2.696	2.465
10+	3.550	3.550	3.550	2.591	2.920	3.519	3.310

Table 10.7 FAROE HADDOCK.

Estimates of Spawning Stock Biomass at the Beginning of each Year and Year Class Strengths of 1-year-old Fish.

Year/Year-Class	Spawning Stock Biomass (1 000 tonnes) Age Groups ≥ 3	Year-Class Strength (millions)
1960	-	48.0
1961	57.1	58.2
1962	65.1	36.9
1963	58.4	27.2
1964	54.3	23.8
1965	54.8	29.9
1966	51.1	58.0
1967	47.5	37.0
1968	50.9	44.3
1969	62.9	18.5
1970	62.5	38.4
1971	66.0	28.3
1972	58.7	66.1
1973	62.1	69.8
1974	60.5	56.8
1975	78.8	28.8
1976	98.1	34.1
1977	99.2	1.6
1978	89.0	-
1979	(75.1)	-
1980	(63.3)	-

Table 10.8. HADDOCK - Faroe (Vb)
Input Data for Catch Predictions.

Age Group	Stock Number 1981 (1 000)	Proportional Fishing Mortality	Average Weight (kg)
1	41 000*	0	0
2	33 568*	0.015	0.634
3	27 438	0.2	0.713
4	803	0.833	0.941
5	11 266	1	1.157
6	6 338	1	1.493
7	6 125	1	1.739
8	3 846	1	2.095
9	1 619	1	2.465
10+	455	1	3.310

Recruits at age 1: 1981 41×10^{6}*

1982 41×10^{6}*

* Average for year classes 1960-1976

Table 10.9 FAROE HADDOCK.
Catch and Biomass Predictions (1 000 tonnes).

Year	Spawning Stock Biomass 1 January	$\bar{F}_{4-7}$	Landings
1980	63	0.29	14.5
1981	67	0.29	12.3
1982	75	0.29	13.4
$\bar{F}_{82}/\bar{F}_{80}$	Landings 1982	$\bar{F}_{4-7}$	Spawning Stock Biomass 1 Jan. 1983
0.2	3.0	0.06	92
0.5	7.1	0.15	87
1.0	13.4	0.29	80
1.5	19.0	0.44	74
2.0	23.	0.58	69

Option 1

$\bar{F}_{81} = \bar{F}_{80}$

Year	Spawning Stock Biomass 1 January	$\bar{F}_{4-7}$	Landings
1980	63	0.29	14.5
1981	67	0.37	15.0 = TAC
1982	72	0.29	12.7
$\bar{F}_{82}/\bar{F}_{80}$	Landings 1982	$\bar{F}_{4-7}$	Spawning Stock Biomass 1 Jan. 1983
0.2	2.8	0.06	89
0.5	6.8	0.15	85
1.0	12.7	0.29	78
1.5	18.0	0.44	72
2.0	22.6	0.58	67

Option 2

F_{81} to take TAC

Table 11.1 Whiting in Divisic b.

Year	Faroe Islands	France	Germany Fed. Rep.	Norway	Poland	UK England	UK Scotland	Others	Total
1960	-	-	-	-	-	70	403	-	473
1961	222	1 200	-	-	-	50	257	-	1 729
1962	-	-	-	-	-	26	197	-	223
1963	-	-	+	-	-	33	285	-	318
1964	-	-	+	-	-	25	117	-	142
1965	-	1 421[a)]	+	-	-	29	97	-	1 547
1966	-	225	-	-	-	28	139	-	392
1967	-	254	1	-	-	31	138	3	427
1968	-	80	1	-	-	46	172	-	299
1969	-	16 991	+	-	-	46	515	-	17 552
1970	-	73	-	-	-	35	251	-	359
1971	150	195	1	-	-	26	166	4	542
1972	-	194	-	-	-	137	139	-	470
1973	384	72	7	-	8	235	394	-	1 100
1974	167	791	3	-	-	89	750	293	2 093
1975	251	1 238	87	-	-	242	973	718	3 509
1976	515	1 659	3	-	-	155	1 160	162	3 654
1977	704	571	6	-	-	137	813	8	2 239
1978	906	9	1	-	-	7	41	-	964
1979*	1 361	41	-	-	-	9	36	-	1 447

*) Preliminary estimates

a) Includes Iceland grounds (Va)

Table 11.2 Tusk in Division Vb.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	UK England	UK Scotland	Total
1960	1 306	-	32	734	135	1 260	3 467
1961	1 301	-	29	1 401	67	1 062	3 860
1962	1 902	-	21	1 134	54	1 405	4 516
1963	2 007	-	29	802	28	695	3 561
1964	2 775	-	137	875	30	799	4 616
1965	1 645	-	115	1 565	32	924	4 281
1966	1 488	-	87	1 221	21	482	3 299
1967	2 070	-	109	2 729	18	432	5 358
1968	2 798	-	91	2 906	23	549	6 367
1969	1 454	-	21	1 338	16	412	3 241
1970	1 028	-	19	1 475	11	515	3 048
1971	1 489	-	44	1 872	13	419	3 837
1972	1 918	-	139	2 421	16	386	4 880
1973	3 402	-	134	3 066	36	531	7 169
1974	1 541	-	137	1 841	22	403	3 944
1975	2 166	-	154	1 848	36	344	4 552
1976	2 548	-	70	2 868	29	496	6 011
1977	3 062	-	68	1 839	12	381	5 362
1978	2 497	25	39	1 961	3	222	4 747
1979	3 877	34	36	2 365	1	252	6 565

Table 11.3 Ling in Division Vb.

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.	Norway	Poland	UK England	UK Scotland	Others		Total
1960	520	-	-	895	400	-	629	855			3 299
1961	603	-	-	11	521	-	241	829			2 205
1962	450	387	-	9	326	-	247	572			1 991
1963	365	1 512	-	17	496	-	183	396			2 969
1964	480	2 844	-	48	736	-	322	632			5 062
1965	416	2 618	-	30	832	-	184	388			4 468
1966	416	1 827	-	39	2 115	-	276	496			5 169
1967	736	23	-	60	3 203	-	172	364			4 558
1968	1 209	177	-	68	3 340	-	152	679			5 625
1969	486	195	-	45	1 952	-	225	602			3 505
1970	699	578	-	42	1 737	-	164	883			4 103
1971	752	728	-	46	2 898	-	152	879			5 455
1972	1 572	866	-	74	3 958	-	146	772			7 388
1973	1 428	398	-	167	3 638	11	268	850			6 760
1974	1 004	296	9	131	2 395	4	308	575			4 722
1975	1 281	345	1	94	2 297	2	231	499			4 750
1976	1 500	1 070	-	61	3 116	-	220	579			6 546
1977	1 675	780	-	72	2 561	-	62	413	1		5 564
1978	1 943	625	-	27	2 953	-	28	220	-		5 796
1979	2 124	304	-	18	3 450	-	23	279	-		6 198

- Indicates no catch or species not separated

Table 11.4 Blue Ling in Division Vb.

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.	Norway	Poland	UK England	UK Scotland	Total
1963	-	-	-	478	-	-	-	-	478
1964	-	-	-	2 493	182	-	-	-	2 675
1965	-	-	-	1 612	1 120	-	-	-	2 732
1966	-	-	-	850	430	-	-	-	1 280
1967	-	-	-	1 133	238	-	-	-	1 371
1968	-	-	-	1 858	788	-	-	-	2 646
1969	-	-	-	249	798	-	-	-	1 047
1970	-	-	-	335	2 612	-	-	-	2 947
1971	-	-	-	1 475	557	-	-	-	2 032
1972	-	-	-	2 779	1 203	-	-	-	3 982
1973	51	-	-	2 931	4 003	-	4	-	6 989
1974	43	390	-	1 808	1 554	-	3	-	3 798
1975	18	2 281	-	1 528	2 492	-	1	-	6 320
1976	48	10 475	-	896	1 519	-	+	-	12 938
1977	23	6 977	-	870	956	-	4	-	8 830
1978	430	3 369	-	744	320	-	35	-	4 898
1979	1 086	2 683	-	706	418	-	6	-	4 899

- Indicates no catch or species not separated

Table 11.5 Lemon Sole in Division Vb.

Year	Faroe Islands	France	UK England	UK Scotland	Others	Total
1960	-	-	351	1 026	-	1 377
1961	-	-	156	1 009	-	1 165
1962	-	-	187	910	-	1 097
1963	-	-	142	706	-	848
1964	-	27	112	305	-	444
1965	-	42	110	393	-	545
1966	-	49	99	297	-	445
1967	-	14	104	321	-	439
1968	-	20	84	404	-	508
1969	-	-	77	362	2	441
1970	-	-	68	424	-	492
1971	590	-	76	303	-	969
1972	300	-	35	244	-	579
1973	1 190	-	126	393	-	1 709
1974	607	-	137	503	-	1 247
1975	971	-	103	369	1	1 444
1976	813	-	120	312	-	1 245
1977	778	-	33	191	+	1 002
1978	746	-	12	35	-	793
1979	797	-	3	10	-	810

Table 11.6 Plaice in Division Vb.

1960	64	-	62	209	-	335
1961	83	-	38	194	-	315
1962	26	-	73	164	-	263
1963	4	226	39	130	-	399
1964	11	131	64	99	-	305
1965	6	92	79	143	-	320
1966	1	108	106	161	-	376
1967	7	54	120	172	2	355
1968	102	28	158	170	-	458
1969	192	31	82	181	-	486
1970	288	-	59	205	-	552
1971	143	-	45	173	-	361
1972	130	+	50	111	-	291
1973	139	-	95	134	4	372
1974	89	44	43	115	-	291
1975	178	2	52	143	4	379
1976	113	43	26	97	1	280
1977	183	25	33	125	+	366
1978	286	6	7	27	7	333
1979	345	-	5	19	-	369

Table 11.7 Halibut in Division Vb.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	UK England	UK Scotland	Total
1960	218	-	58	439	-	686	1 397	2 798
1961	222	-	165	327	-	287	1 237	2 238
1962	137	-	11	299	-	325	1 126	1 898
1963	161	-	10	128	-	241	887	1 427
1964	174	-	63	110	-	239	792	1 378
1965	276	-	35	124	-	292	725	1 452
1966	169	-	36	120	-	248	636	1 209
1967	245	-	57	180	-	178	749	1 409
1968	267	-	64	90	-	130	698	1 249
1969	205	-	18	151	-	124	558	1 056
1970	296	-	10	182	-	74	514	1 076
1971	234	-	14	197	-	92	371	908
1972	212	-	35	155	-	60	256	718
1973	256	-	52	78	5	144	359	894
1974	141	-	54	56	4	105	218	578
1975	162	65	73	75	-	93	207	675
1976	300	-	37	164	-	88	248	837
1977	316	-	34	121	-	18	138	627
1978	353	-	68	74	-	12	100	607
1979	442	117	24	121	-	4	149	857

Table 11.8 Megrim in Division Vb.

Year	Faroe Islands	France	Germany, Fed.Rep.of	Norway	Poland	Spain	UK England	UK Scotland	Total
1960	-	-	-	-	-	-	9	21	30
1961	-	-	-	-	-	-	8	17	25
1962	-	-	-	-	-	-	6	19	25
1963	-	-	-	-	-	-	5	26	31
1964	-	50	-	-	-	-	5	20	75
1965	-	47	-	-	-	-	5	17	69
1966	-	237	-	-	-	-	5	14	256
1967	-	212	-	-	-	-	1	6	219
1968	-	250	-	-	-	-	3	6	259
1969	-	312	1	-	-	-	3	8	324
1970	-	99	-	-	-	-	1	9	109
1971	-	37	-	-	-	-	2	9	48
1972	-	38	-	-	-	-	3	10	51
1973	-	-	-	-	-	-	4	11	15
1974	-	-	-	-	-	10	8	12	30
1975	-	6	-	-	-	14	4	8	32
1976	-	8	-	-	-	6	3	11	28
1977	-	61	1	-	-	-	2	7	71
1978	-	17	-	-	-	-	1	2	20
1979	-	17	+	-	-	-	1	3	21

Table 11.9 Redfish in Division Vb

Year	Faroe Islands	France	German Dem.Rep.	Germany, Fed.Rep.of	Norway	UK England	UK Scotland	Total
1960	-	-	-	2 295	-	276	60	2 631
1961	-	-	-	3 577	-	50	38	3 665
1962	-	-	-	2 237	-	52	49	2 338
1963	1	366	-	2 035	-	31	60	2 493
1964	-	705	-	7 119	-	41	43	7 908
1965	1	582	-	4 864	-	38	27	5 512
1966	-	-	-	3 180	-	8	40	3 228
1967	-	-	-	4 853	-	24	22	4 899
1968	1	-	-	6 613	-	43	10	6 667
1969	5	-	-	1 225	-	13	15	1 258
1970	-	-	-	2 020	-	13	20	2 053
1971	-	-	-	2 479	-	12	12	2 503
1972	-	-	-	4 027	-	40	13	4 080
1973	121	-	-	9 439	-	72	13	9 645
1974	28	300	1	7 328	10	74	24	7 765
1975	9	800	1	7 628	7	18	23	8 486
1976	33	-	-	5 255	17	13	46	5 364
1977	54	1 368	-	5 854	7	78	38	7 399
1978	1 525	448	-	7 767	9	51	6	9 806
1979	5 693	862	-	6 108	11	+	+	12 674

Table 11.10 Angler (Monk) in Division Vb.

Year	Faroe Islands	France	Germany, Fed.Rep.of	UK England	UK Scotland	Others	Total
1960	-	-	7	314	811	-	1 132
1961	-	-	11	167	695	-	873
1962	-	-	4	179	641	-	824
1963	-	-	2	160	618	-	780
1964	-	-	3	218	347	-	568
1965	-	-	-	212	326	-	538
1966	-	-	-	164	349	-	513
1967	-	-	-	118	308	-	426
1968	-	-	3	159	335	-	497
1969	1	26	1	175	429	-	632
1970	-	10	-	127	542	-	679
1971	-	-	-	132	532	-	664
1972	-	-	3	99	388	-	490
1973	535	-	6	193	414	-	1 148
1974	418	-	22	167	413	40	1 060
1975	456	19	7	125	347	90	1 044
1976	511	123	5	138	360	3	1 140
1977	558	61	4	37	230	2	892
1978	909	28	1	26	113	1	1 078
1979	988	23	2	8	36	2	1 059

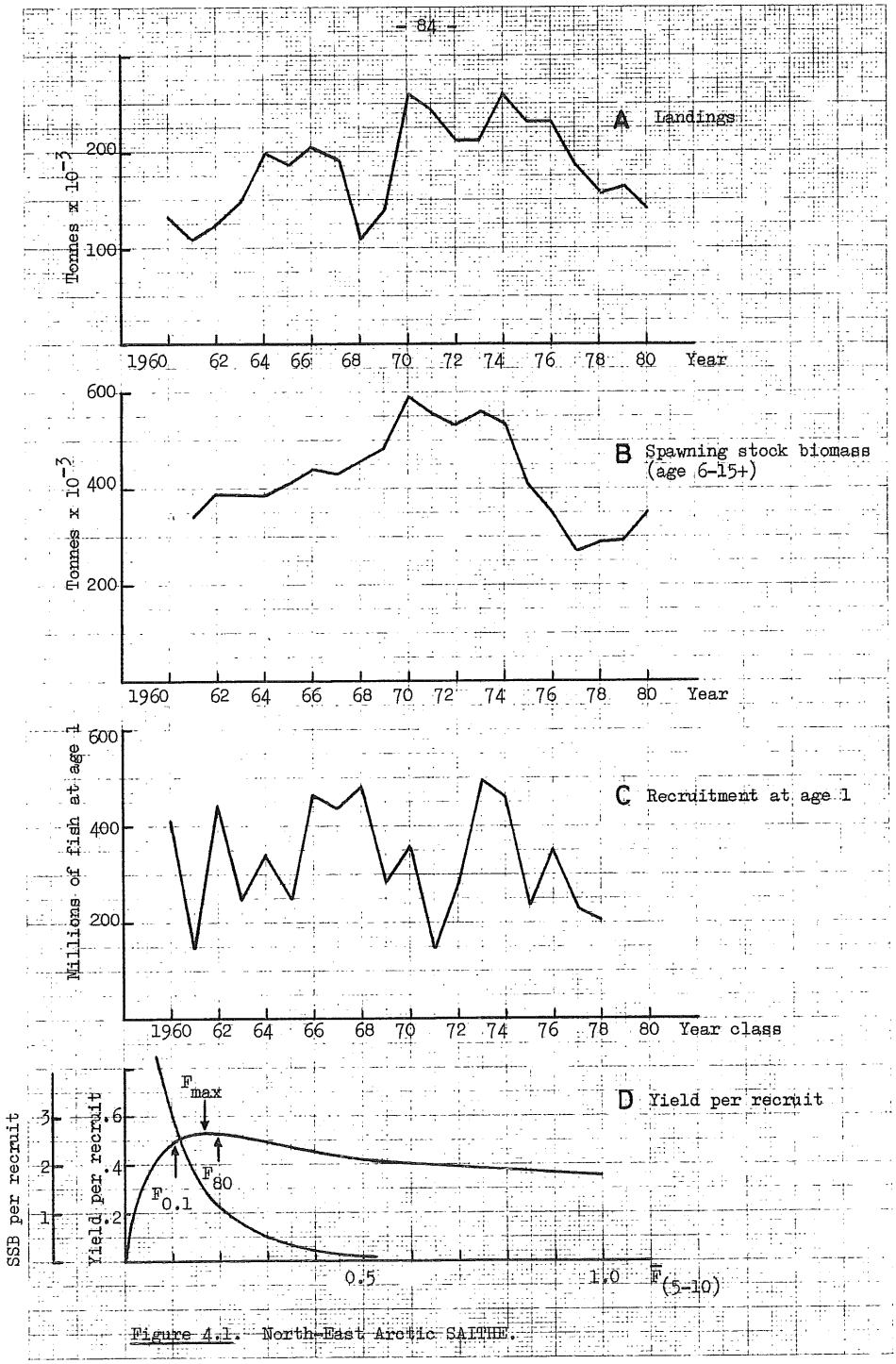


Figure 4.1. North-East Arctic SAITHE.

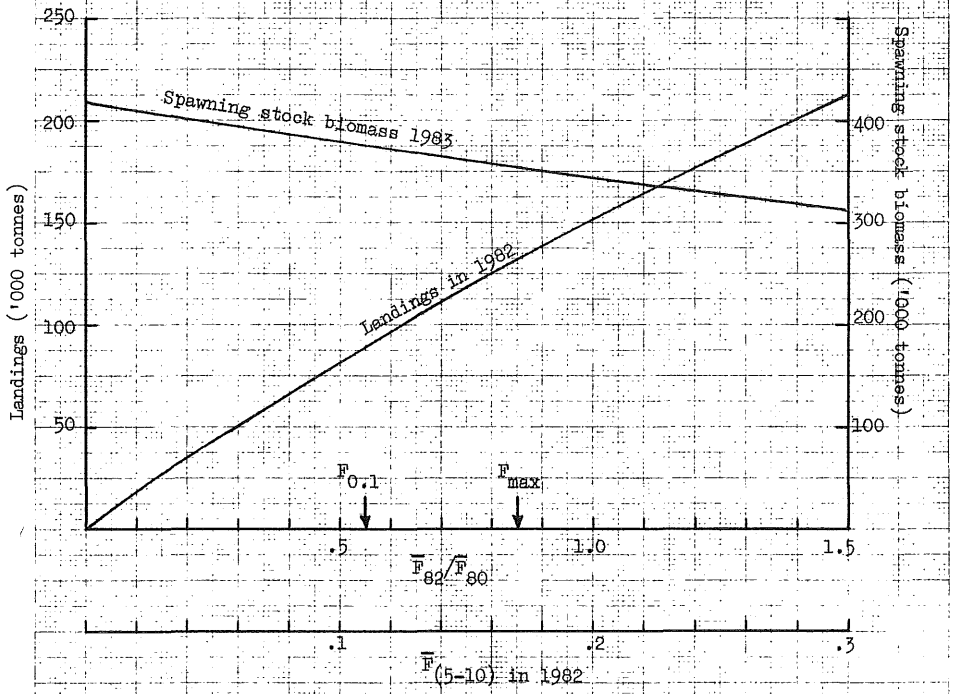
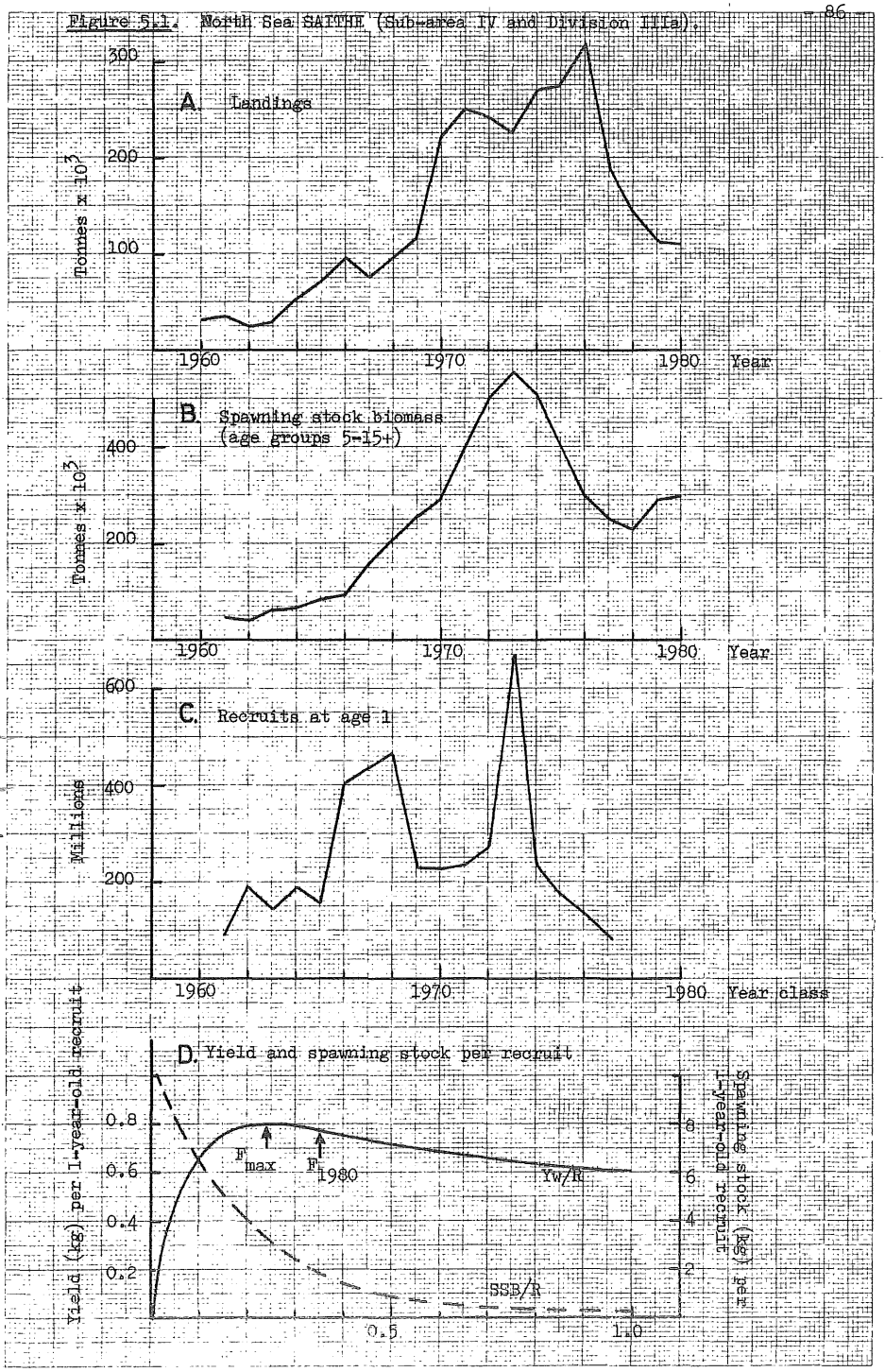


Figure 4.2. North-East Arctic SAITHE. Predictions for landings in 1982 and spawning stock biomass in 1983.

Figure 5.1. North Sea SAITHE (Sub-area IV and Division IIIa).



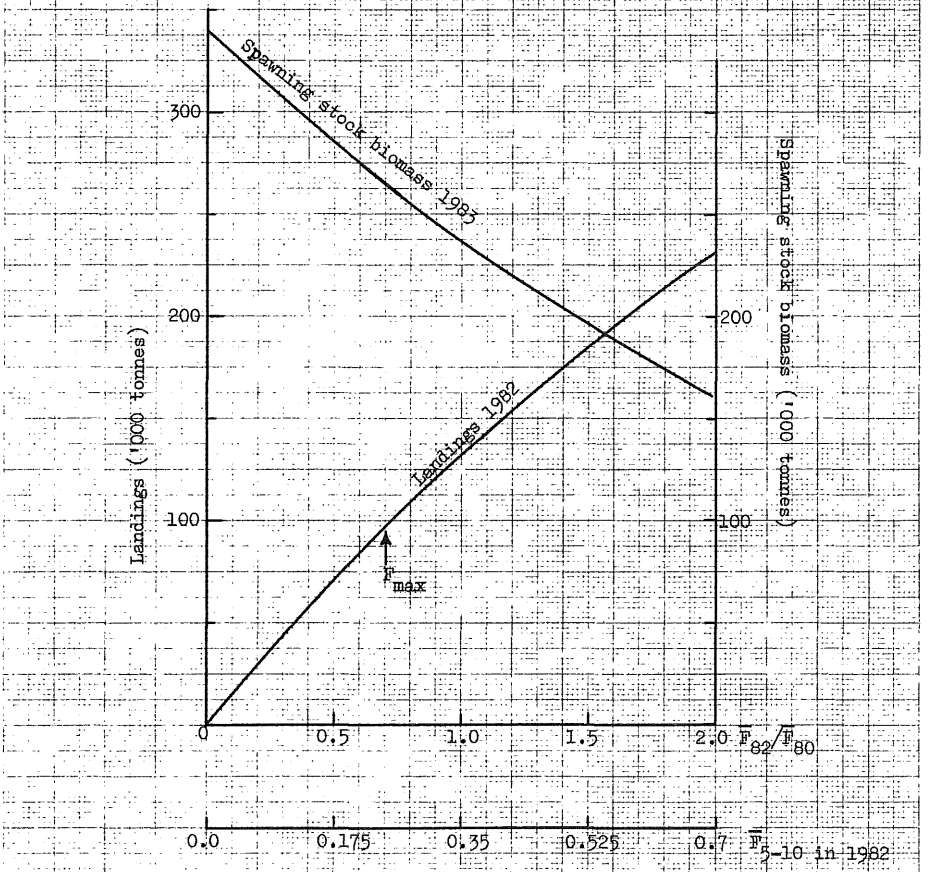


Figure 5.2. North Sea SAITHE. Predictions for landings in 1982 and spawning stock biomass in 1983.

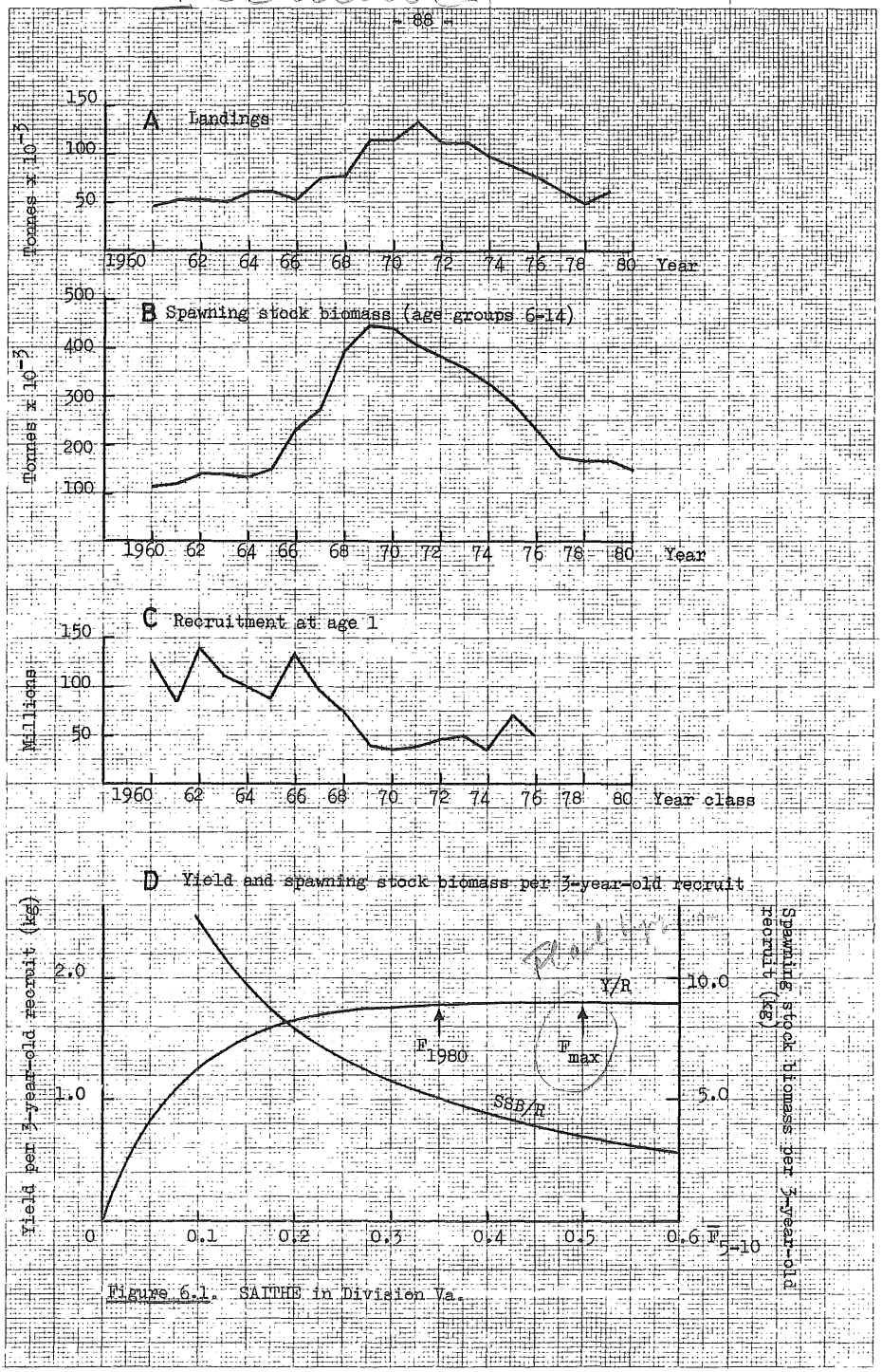


Figure 6.1. SAITHE in Division Va.

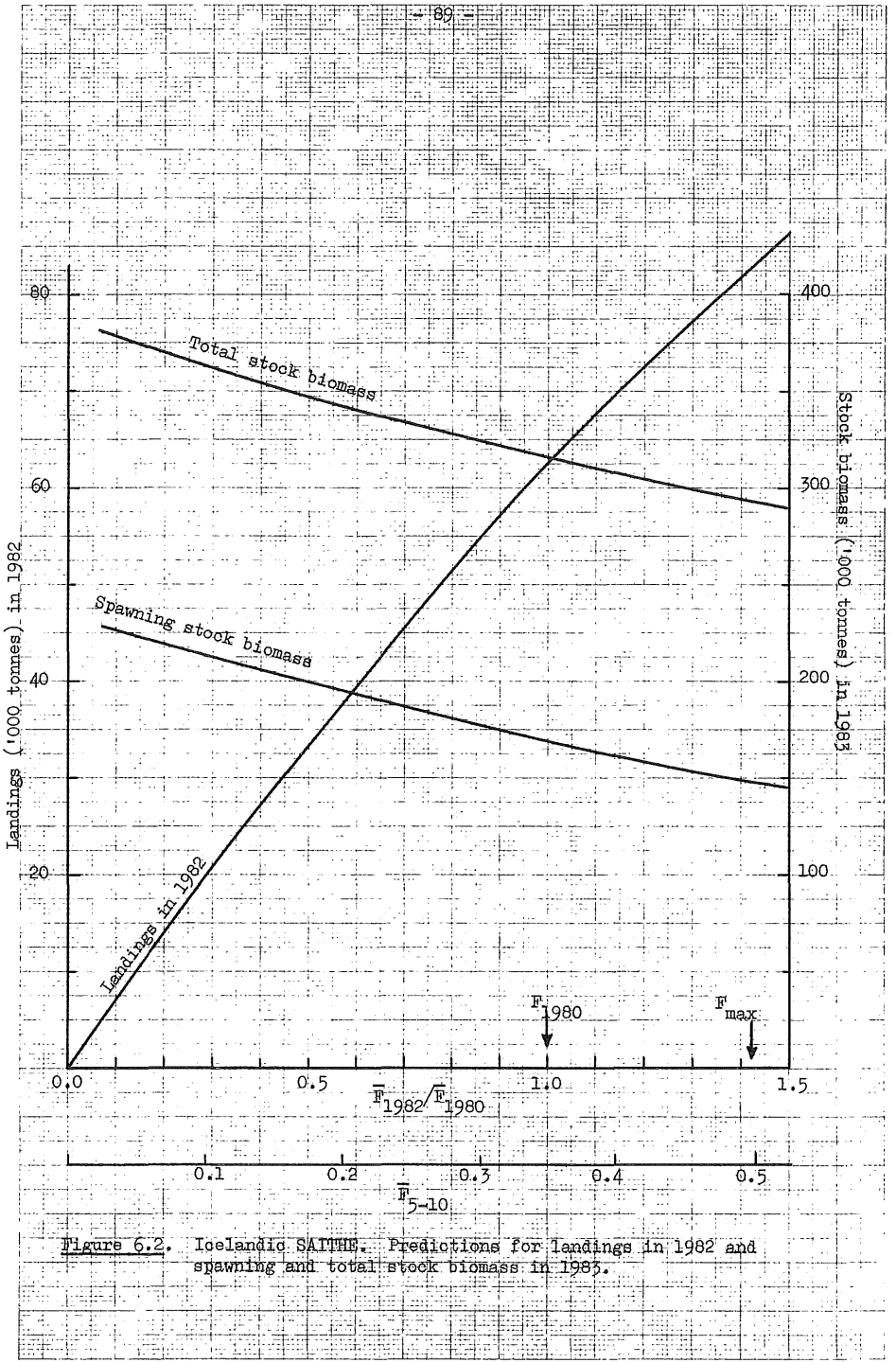
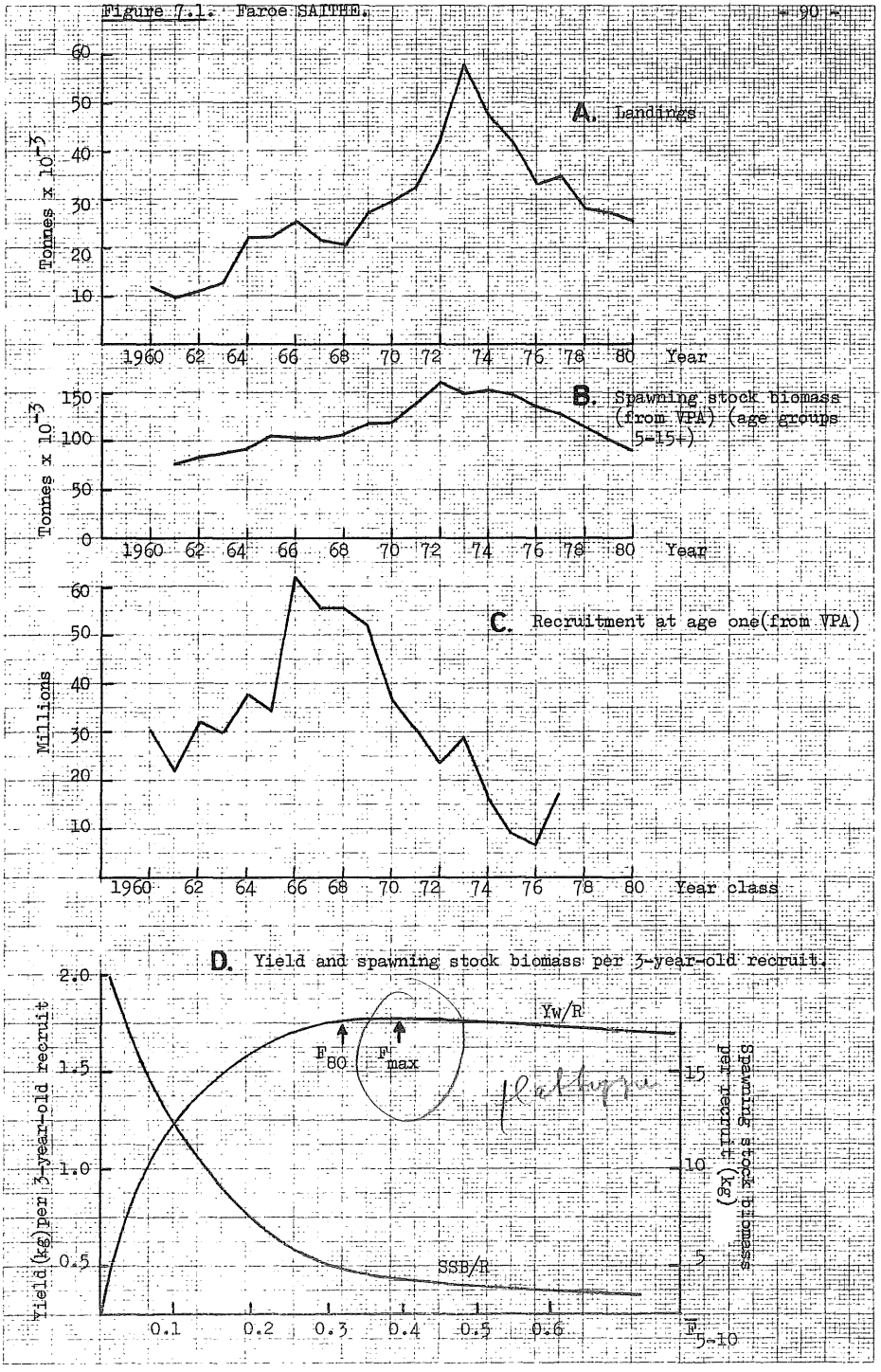


Figure 6.2. Icelandic SAITHE. Predictions for landings in 1982 and spawning and total stock biomass in 1983.

Figure 7.1. Faroe SATTHE.



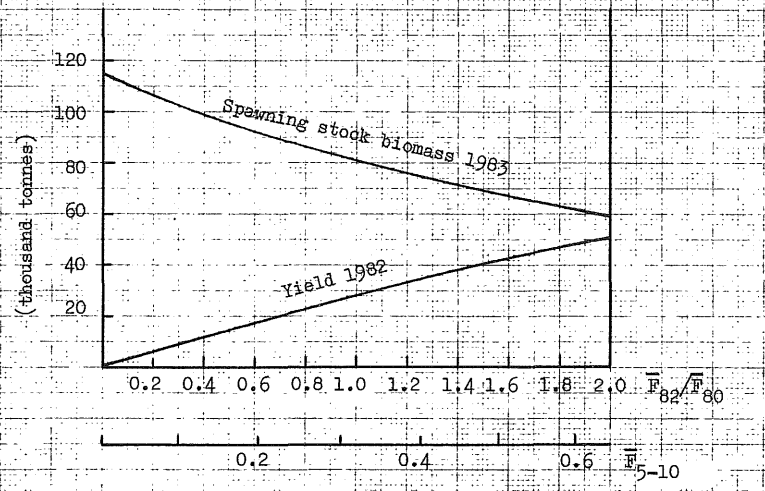
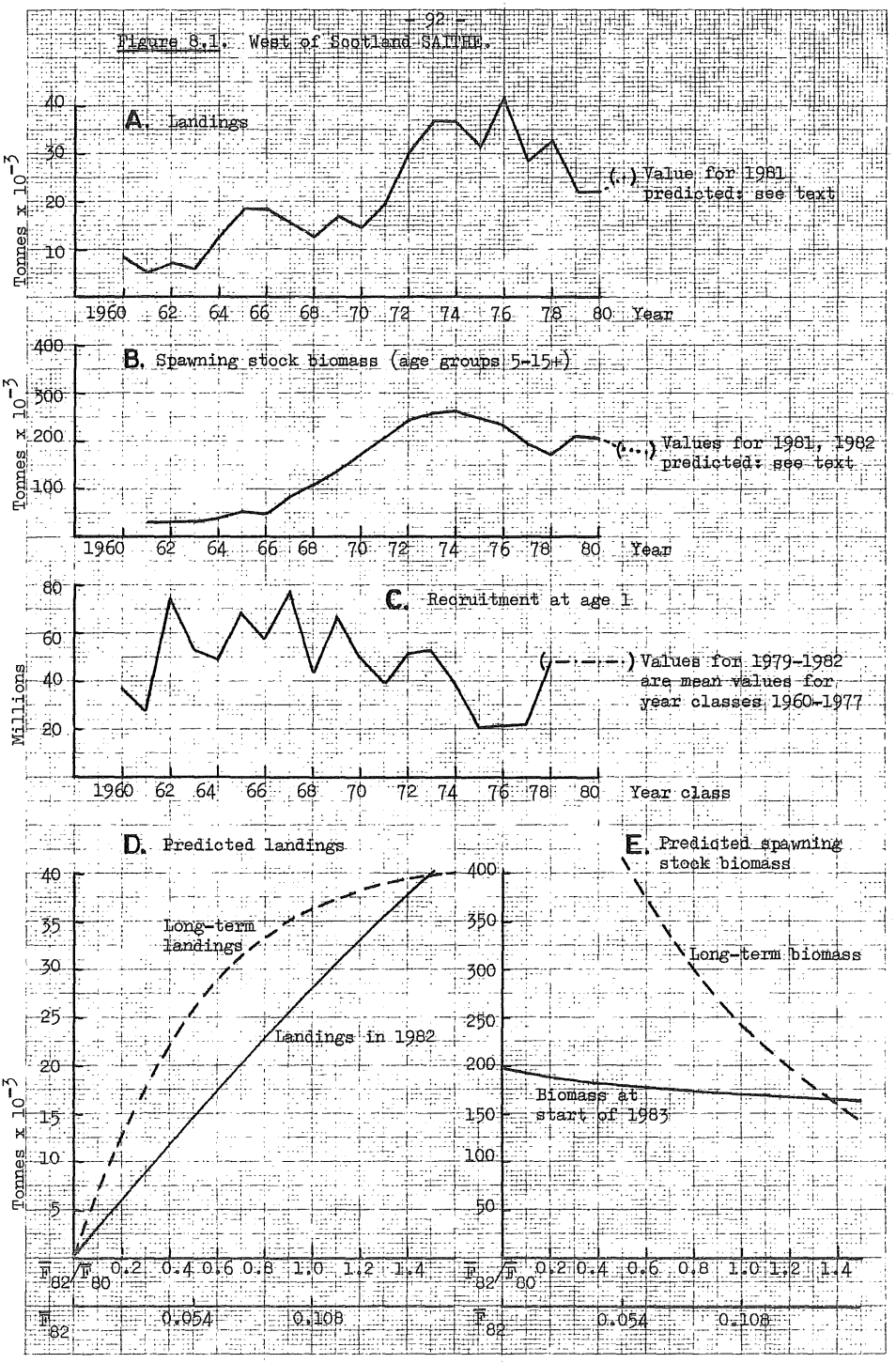


Figure 7.2. Faroe SAITHE. Predictions for landings in 1982 and spawning stock biomass in 1985, assuming 1978 is a good year class.

Figure 8.1. West of Scotland SAITH.



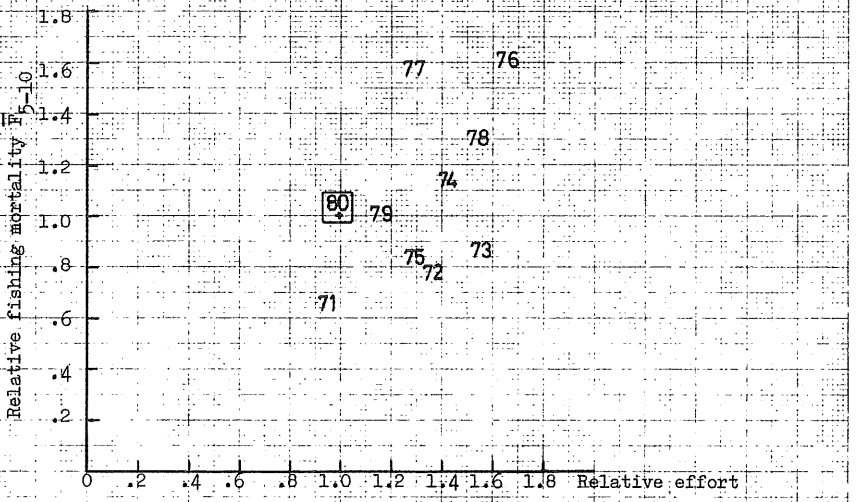


Figure 8.2. West of Scotland SAITHE. Fishing mortality vs fishing effort.

Figure 9.1. Faroe Plateau COD.

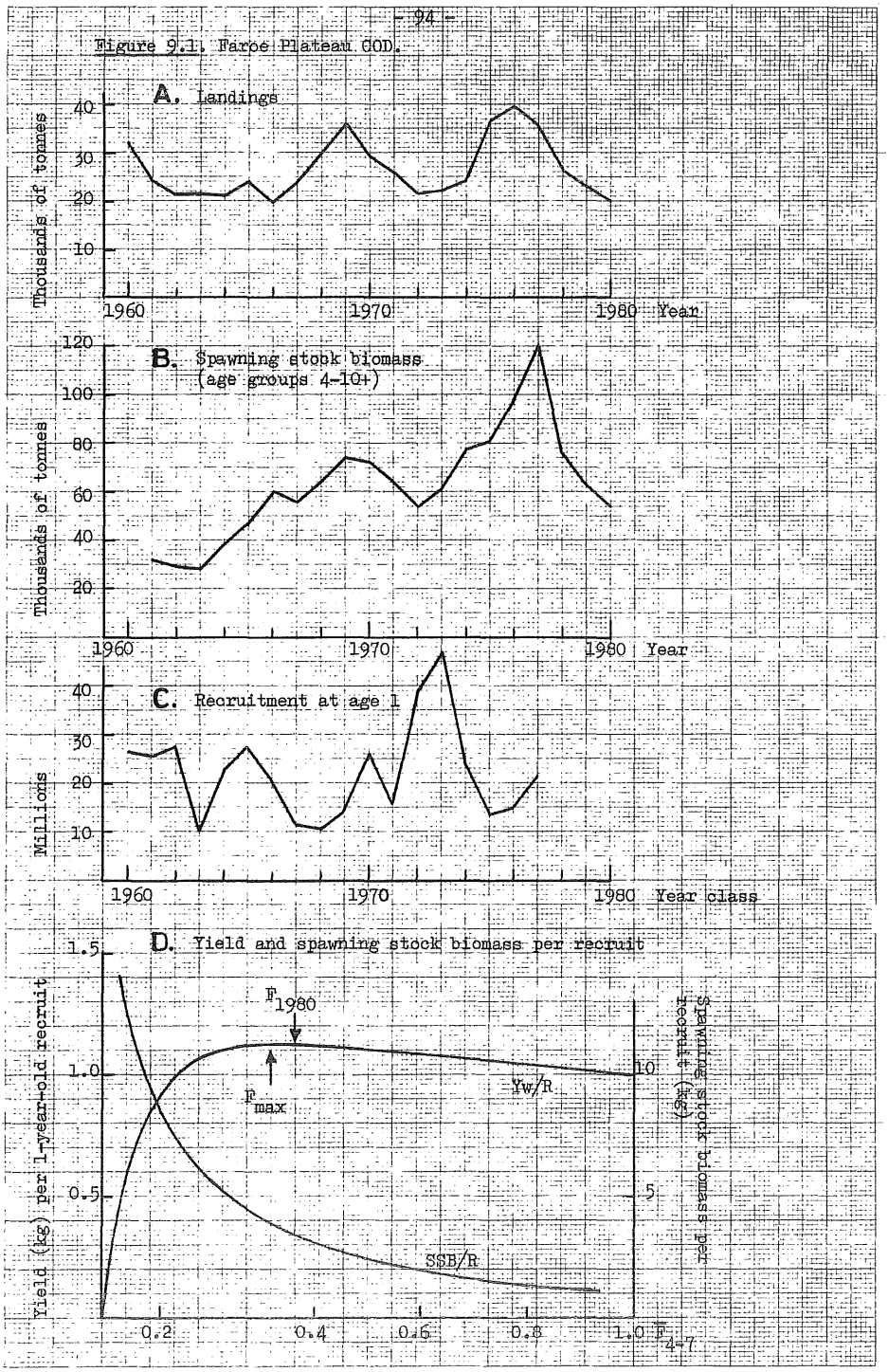


Figure 9.2. Faroe Plateau COD. Catch predictions for 1982 and spawning stock biomass at 1 January 1983.

Figure 10.1. Faroe HADDOCK.

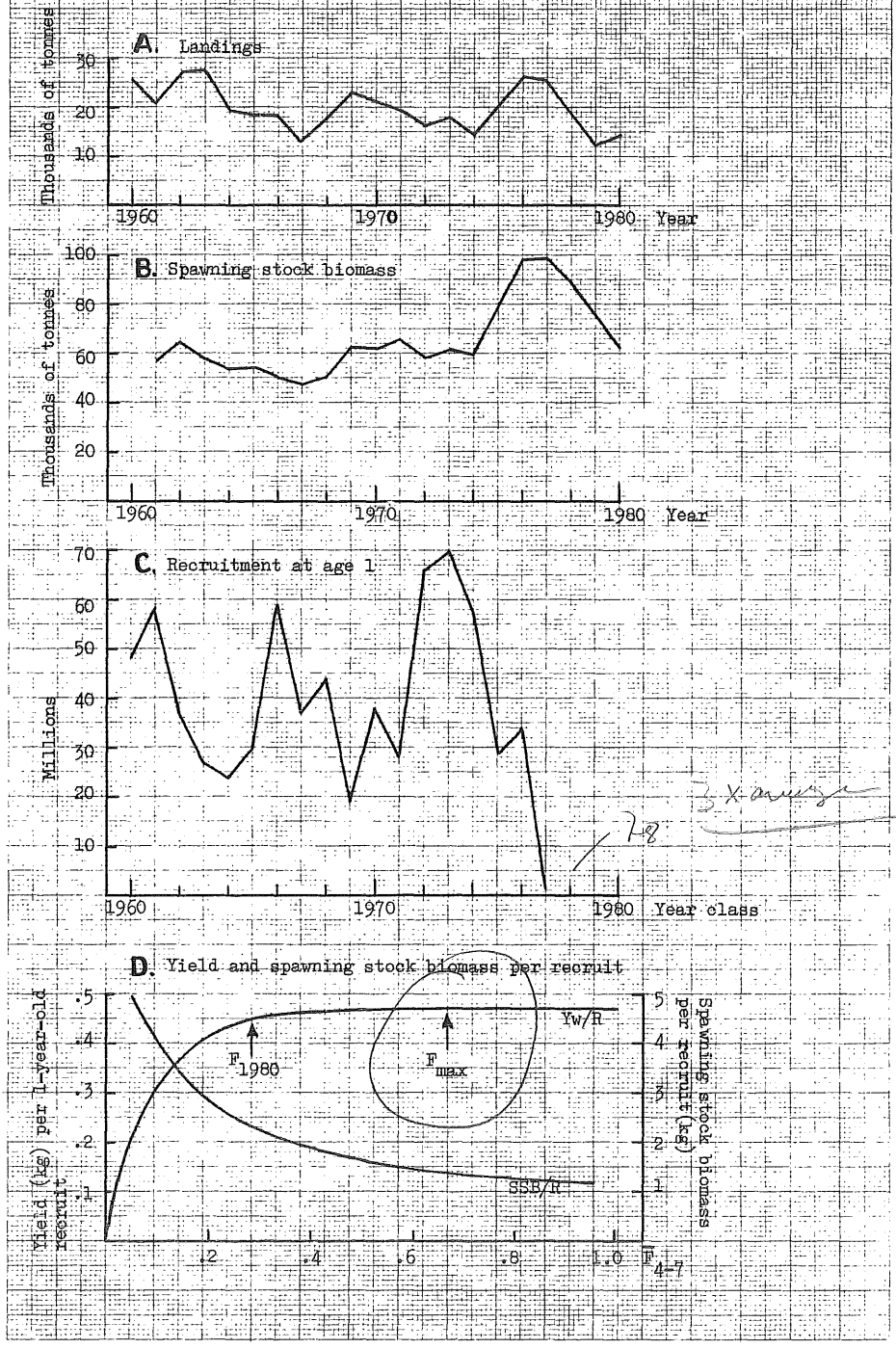
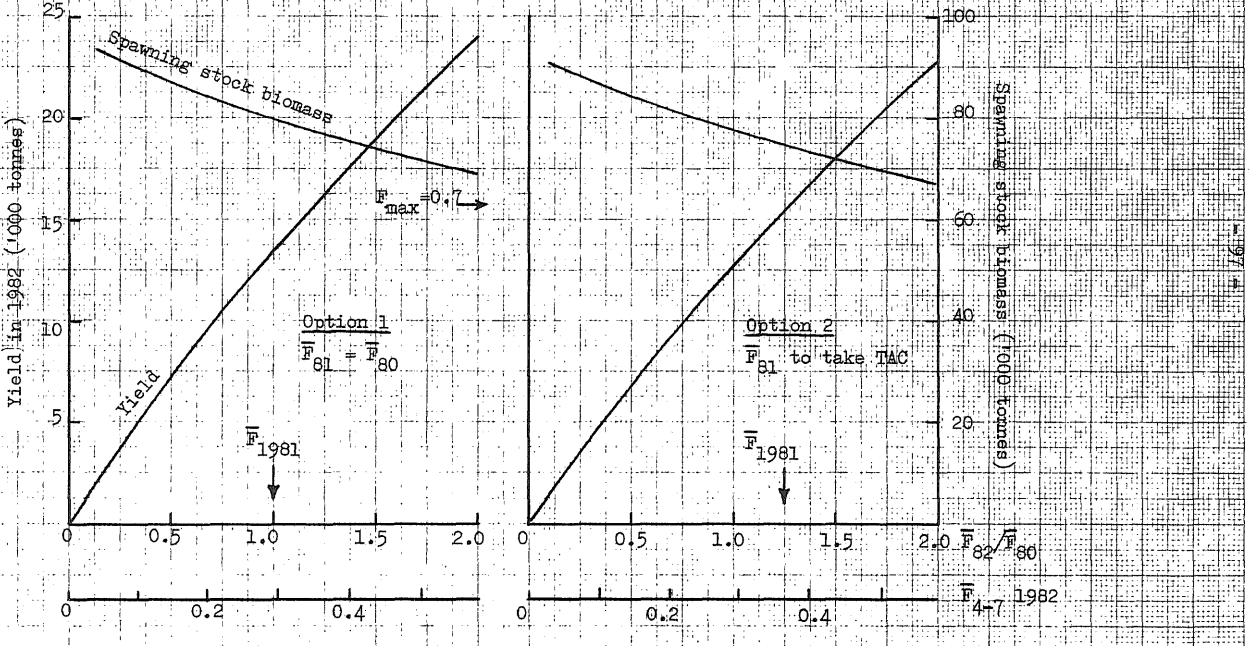


Figure 10.2. Faroe HADDOCK. Catch predictions for 1982 and spawning stock biomass at 1 January 1983.



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ERRATA TO C.M.1981/G:9 - Report of Saithe Working Group

page 67 - Table 9.9, in the middle block: substitute

"F_{82}/F_{81}" with "F_{82}/F_{80}"

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